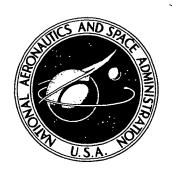
# VASA TECHNICAL MEMORANDUM



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# SPACE APPLICATIONS INSTRUMENTATION SYSTEMS

by R. A. Minzner and J. D. Oberholtzer

Electronics Research Center

Cambridge, Mass. 02139

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|  |  |                            |                                 |                             |
| 16. Abstract   |  |                            |                                 |                             |
| A Compendium of resumes of   | of 158 instrument                        | systems or experimen       | nts of particula                | ar interest                 |
| to space applications, is pres   |  |                            |                                 |                             |
| entries for 26 administrative  | items and 39 sci                         | entific or engineeri       | ng items. A Tab                 | le of                       |
| Contents shows that the resume spacecraft with which the inst  | ruments are asso                         | ciated. The resumes        | are followed by                 | six                         |
| different cross indexes; each  | organized alphabe                        | etically according to      | o one of the foll               | lowing                      |
| catagories: Instrument Name, Acronym, Name of Principal Investigator Organization Employing the Principal Investigator, Assigned Experimen |  |                            | ment Number. end                | Space-                      |
| craft Name. The resumes are associated with a computerized   |  |                            | ment Resume Sear                | ch and                      |
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## SPACE APPLICATIONS INSTRUMENTATION SYSTEMS

By R. A. Minzner and J. D. Oberholtzer Electronics Research Center

#### SUMMARY

A compendium of resumes of 158 instrument systems or experiments, of particular interest to space applications, is presented. Each resume exists in a standardized format, permitting entries for 26 administrative items and 39 scientific or engineering items. A Table of Contents shows that resumes are organized into forty groups determined by the forty spacecraft with which the instruments are associated. The resumes are followed by six different cross indexes; each organized alphabetically according to one of the following catagories: Instrument Name, Acronym, Name of Principal Investigator, Name of Organization Employing the Principal Investigator, Assigned Experiment Number, and Spacecraft Name. The resumes are associated with a computerized Instrument Resume Search and Retrieval System (IRSARS).

#### INTRODUCTION

This document presents an interim report on Project 160-44-02-28-25, the objective of which has been to maintain an up-to-date survey of instrument systems of particular interest in space applications, and primarily intended for unmanned spacecraft. The continuing objective has been realized to date by the preparation of this compendium of standardized resumes for 158 specific systems. The systems described range from instruments (or experiments) which have already flown in orbiting spacecraft, to proposals for development projects. Each principal investigator, except any associated with instruments in the GEOS and ERTS satellites, and any recently appointed, has had the opportunity of reviewing some version of all resumes in which he is named. The set of resumes is preceded by an extensive Table of Contents; the resumes are followed by six different indexes.

The set of resumes is divided into two major groups. The first group, Part I, contains resumes describing instruments (or experiments) which have been built and flown, or are being built and tested for specifically planned flights. This group includes the resumes of about 100 space applications instruments (or experiments) associated with approximately forty spacecraft. The group includes separate resumes for each of a number of nominally similar instruments in each of several spacecraft. Such apparent duplication is necessary because successive models of essentially the same

instrument for different spacecraft are rarely alike. (An example of an instrument that has several models is the Satellite Infrared Radiometer Spectrometer, SIRS, which is aboard Nimbus 3, and scheduled to fly on Nimbus D.)

The second major group, Part II, contains those resumes for instruments (or experiments) which have been proposed but which have not been scheduled for flight in specific spacecraft, and for which production funds were not or have not yet been granted. The application instruments and experiments which were originally proposed for the Apollo program are included in this group. In a few instances, for proprietary reasons, the principal investigator has not released for general publication a resume listed in the Table of Contents and Indexes. In these cases, the indexing information has been retained for completeness, but the resume has been deleted so that the distribution of this document need not be limited.

Each resume is printed as a single page, and is a photographically reduced version of an original which was printed by a computer output device onto a special form. The form allows for sixty-five printed entries (ref. 1), and represents a slight modification of an earlier form having sixty-eight printed entries (ref. 2). The information for each item in a resume, in accordance with its own specific format (ref. 2) had been entered into a computer input and storage system previously. A computer program named IRSARS (ref. 2 and 3) permits a search to be made within the stored information for those instruments having characteristics which comply with specific limits of conditions of any of thirty-seven of the entries. The selected resumes or part thereof may be printed by the computer output device. No provisions have been made in IRSARS for either computer storage or computer printout of the diagrams called for in Item 66. Suitable diagrams have been collected for some of these resumes, but no attempt has been made to include any figures in this edition of the compendium.

The Table of Contents preceding the two groups of resumes, and the six indexes which follow the resumes have some intrinsic interest. The Table of Contents shows that resumes have been organized into a number of sections named after the forty associated spacecraft; these section names serve as an alphabetical index of these spacecraft. (A separate spacecraft listing is given in Index 6.) The names of the associated instruments (or experiments) are arranged alphabetically under each section name. Entries for similar instruments are each found under the appropriate spacecraft-section name rather than being grouped together. Thus, for example, the Satellite Infrared Radiometer Spectrometer, SIRS, can be found listed under Nimbus 3 as well as under Nimbus D; the Filter Wedge Spectrometer (FWS) can be found listed under Nimbus D in the first group of resumes, as well as under Apollo

Applications in the proposal group. In addition to the instrument name, each entry of any section of the Table of Contents also includes an acronym (or an abbreviation for the instrument of experiment name), any experiment numbers assigned by NASA Headquarters, and the name of the principal investigator for that instrument (or experiment).

The six indexes following the resumes also have been prepared with auxiliary material.

The first index is basically an alphabetical listing of the instrument (or experiment) names of the entire set of resumes (in contrast to the Table of Contents where the alphabetical listing was within sections separated according to spacecraft). Otherwise this index has the same information as that contained in the Table of Contents.

The second index is an alphabetically-arranged list of the names of the principal investigators. Each entry of this index also contains the organizational affiliation of the principal investigator, the acronym, the name of the spacecraft to which the instrument is assigned and, finally, any Headquarters-assigned experiment number.

The third index is an alphabetically-arranged list of the acronyms for the instrument (or experiment) name. Each entry of this index also contains the name of the spacecraft with which the system is identified, any assigned experiment number, the name of the associated principal investigator and, finally, the name of the instrument (or experiment).

The fourth index is an alphabetically-arranged list of the names of organizations by which each of the respective principal investigators is employed. Each entry of this index also includes the name of the principal investigator, the acronym, and the name of the associated spacecraft.

The fifth index is organized alphabetically and numerically according to a Headquarters-assigned experiment number. For example, the designation EOl was given to the Limb Radiance Experiment proposal for the Nimbus E satellite, and SO40 was assigned to the proposal for the Dielectric Tape Camera System for an Apollo Applications spacecraft. Since only a few instruments have been assigned these numbers, this is a relatively small index.

The sixth and final index is a simple alphabetical listing of spacecraft relevant to this document. The page number indicates the location of the beginning of the group of resumes describing the instrument systems associated with each of these spacecraft.

The information contained in this survey is believed to be accurate to January 1970. The future responsibility for the continuing work in this study will be assumed by: R. Drummond of Goddard Space Flight Center, Code 731, Greenbelt, Md., Telephone: 301/982-6731. Corrections and suggestions for improving the resumes should be sent to Mr. Drummond.

The authors wish to acknowledge the support of this work by Jules Lehmann in the Office of Space Science and Applications at NASA Headquarters, and would like to thank the staff at the IIT Research Institute who contributed to this volume, particularly, William Vest, Jerrold Miller, and Peter Bock.

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| E FED INTO A DIFFERENTIAL ANDLIFIER AND A SUM DIFFERENTIAL AMPLIFIER YIELDS A SINUSODIAL SUT OTHE SUM OF THE AMPLITUDES OF THE TWO INF OUTPUT OF THE SUMMING ANDLIFIER IS PROPORTION HE 2 DC COMPONENTS. THE INSTRUMENT HAS A SENS 5 V PER GAMMA WHERE GAMMA EQUALS 10 TO THE MI YNAMIC RAGGE IS 4-50, 100, 0R 200 GAMMA. RITH FEST FIELD GENERATOR, THE TOTAL DYNAMIC RAGGES THE LEST OF STANDENT AND TERRESPONSE BANDWIDTH IS PROM DC TO 100 HZ. PUT VOLTAGE OF 0 TO 4 5.0 VDC.  | TONAL TO THE MAGNETIC FIELD PERPENDICULAR TO THE SPIN AXIS.  |  |
| L TO THE SUM OF THE AMPLITUES OF THE COUTD OF THE SUM OF THE SUM OF THE SUM OF THE SUMMING AMPLITUES OF THE TWO INFO OUT OF THE SUMMING AMPLITUES OF THE SUMON OUT OF THE SUMMING AMPLITUES OF THE SERVICE OF THE SERVICE OF THE SERVICE OF THE SUMMING AMMA. THE SUMMING RANG OF SUMMING AND OUT OF THE SUMMING OF THE SUMING OF THE S | NOTH CUTPUTS ARE FED INTO A DIFFERENTIAL AMPLIFIER AND A SUMMING   |  |
| OUTPUT OF THE SUMMING AMPLIFIER IS PROPORTIC HE 2 DC COMPONENTS. THE INSTRUMENT HAS A SEN 5 V PER GAMMA WHERE GAMMA EQUALS 10 TO THE NI MAMIC RANGE IS +-50, 100, OR 200 GAMMA. WIT PESET FIELD GENERATOR, THE TOTAL DYNAMIC RANG 125 GAMMA AND675 GAMMA. THE INSTRUMENT AC 125 GAMMA MITH A NOISE LEVEL OF 0.1 GAMMA. T TER RESPONSE BANDWIDTH IS PROM DC TO 100 HZ.  PUT VOLTAGE OF 0 TO + 5.0 VDC.  | THE DIFFERENTIAL ABELIETER<br>TOWN THE SIM OF THE AMPL   |  |
| HE 2 DC COMPONENTS. THE INSTRUMENT HAS A SEN V PER GANNA WHERE GANNA BOUALS 10 TO THE NI PRANT FREE CANNA. BOUALS 10 TO THE NI PREE TELD GENERATOR, THE TOTAL DYNAMIC RANG 925 GANNA AND - 675 GANNA. THE INSTRUMENT AC 125 GANNA MITH A NOISE LEVEL OF 0.1 GANNA. TERRESPONSE BANDWIDTH IS FROM DC TO 100 HZ.  TERRESPONSE BANDWIDTH IS FROM DC TO 100 HZ.  THE RESPONSE DANGETH IS FROM DC TO 100 HZ.  MAA PARALLEL AND -50 TO+50 GANNA PERP TO S/C  | SINUSOIDS. THE OUTPUT OF THE SUMMING AMPLIFIER IS PROPORTIONAL   |  |
| Y PER GARRA WHENE GARRA EQUALS TO TO THE TAY IN A TRANIC RANGE IS 4-50, 100, OR 200 GARRA. AND EPESET FILLD GARRA. THE TOTAL DYNAMIC RANGES GARRA AND - 675 GARRA. THE INSTRUMENT ACTER RESPONSE BANDWIDTH IS FROM DC TO 100 HZ. FUT VOLTAGE OF 0 TO + 5.0 VDC.  | THE INSTRUMENT   |  |
| PESET FIELD GENERATOR, THE TOTAL DYNAMIC RANG 925 GAMMA AND - 675 GAMMA. THE INSTRUMENT AC 125 GAMMA WITH A NOISE LEVEL OF 0.1 GAMMA. THER RESPONSE BANDHIDTH IS PROM DC TO 100 HZ. PUT VOLTAGE OF 0 TO + 5.0 VDC.   | SILIVITY OF U.O.S V PER GAMMA WHERE GAMMA EQUALS TO IN THE MINUS.<br>5 CAUSS. THE DINAMIC RANGE IS +-50, 100, OR 200 GAMMA. WITH |  |
| 925 GANNA AND - 6/5 GANNA. THE INSTRUMENT AGAINA. TER RESPONSE BANDWIDTH IS FROM DC TO 100 HZ.  PUT VOLTAGE OF 0 TO + 5.0 VDC.  MMA PARALLEL AND -50 TO+50 GANNA PERP TO S/C   | TOTAL DYNAMIC RANGE  |  |
| TER RESPONSE DANDHIDTH IS PROM DC TO 100 HZ.  PUT VOLTAGE OF 0 TO + 5.0 VDC.  MMA PARALLEL AND -50 TO+50 GAMMA PERP TO S/C   | THE INSTRUMENT A   |  |
| PUT VOLTAGE OF 0 TO + 5.0 VDC.  MAA PARALLEL AND -50 TO+50 GAMMA PERP TO S/C   | OTH IS FROM DC TO 100 HZ.  |  |
| MMA PARALLEL AND -50 TO+50 GAMMA PERP TO S/C   | UT VOLTAGE OF 0 TO + 5.0   |  |
| MMA PARALLEL AND -50 TO+50 GAMMA PERP TO S/C   | L. FRENOMENA USSENVED MAGNETIC PIELD   |  |
| A PARALLEL AND -50 TO+50 GAMMA PERP TO S/C   |  |  |
| THE PRODUCTION AND ACCOUNTS.   | A PARALLEL AND -50 TO+50 GAMMA PERP TO S/C   |  |
|  | A PRECISION AND ACCOUNTS   |  |

| The state of the s | S. SPECTRAL RESOLUTION 12. TIME CONSTANT   |
|--|--|
| ACCINENT ALCOHOR   | 6.212 TO 6.301 GHZ 25. MHZ   |
| Consideration of the State of the Constant of  | A GROUND SWATH   |
| İ  | (8.0 BI 23.0 DEG LIBETIO-LIBE Y 100 NR FROM GEO-SINCH ALX  |
| DWAVE TRANSPONDER  |  |
|  | ALTITUDE 15 INCLINATION  |
| 11/10/69,0004  | 4 1 4 1 4  |
| GODDARD SPACE FLT CENTER 301-982-4094  |  |
| 1: TELEPHONE   | ANNS FINA SECUCIONA  |
| TE CONTREM TO CONTINUES NUMBER 18, 1, 1, 231, 18, 18, 18, 18, 18, 18, 18, 18, 18, 1  | LINGS A VENE SO MYER SO POWER DE STENDEN POWER SO MYBE   |
| 12/66 OPERATIONAL  | 7  |
| TO AGENCY  | TO THE STATE OF TH |
| BURKE, J.R. 18. INASA HOOTRS. OSSA/SCS, 202-962-0581   | SOURC/SEN  |
| AIRCRAPT CO EL SEGUNDO, CALIPORNIA 12/66   | REALTINE TELEMETRY   |
| 4.8.42   | Townstink ABOUNDMENTS  |
| TRANSPONDER, 6-GHZ (RECEIVE) 4-GHZ (TRANSMIT) SHF UNC  | NA NA  |
|  |  |
| 20SE   | ** ADV. VIASES ARD LIMITATIONS   |
| . 0  |  |
| AND DIGITAL DATA DOLING SON TRANSMITTER AND RECELVER IN BULLIFIER  | 64. HERERINGES   |
| ACCESS BODE AND A RIGH COMPILE EN SISIEM FOR LEESTIGON AND ULTER. STATE PRINTEY THE SPACE.   | 1 -  |
| NANSHITTED SIGNAL INDEPENDENT OF THE NUMBER OF CH  | PRESS KII, ATS-8, RELEASE NO.66-308, DRC. 1  |
| IN OSE.  |  |
| FULL TAREBURDAY IN STRITED TO THOSE HERD ON AFG-2 AND AFG-3  |  |
| RECEIVING AND TRANSMITTING ANTENNAS AND TRAVELING-WAVE-TUBE  |  |
| POWER AMPLIPIERS ARE USED IN CONJUNCTION WITH A DUAL-MODE COMM-  | ' Sé -HOTDRICH: REWARKS  |
| UNICATION TRANSPONDER TO PROVIDE A SYSTEM ELEMENT CAPABLE OF AC-   | THIS INSTRUMENT IS SIMILAR TO THOSE FLOWN ON ATS-2 AND ATS-3.  |
| CEPTING AND HANDELNG AND TIPE OF COMMONICATIONS TRAFFIC OR WIDE.   | CONTRACTOR OF THE PROPERTY OF  |
| PRIMARILY FOR TELEVISION OR OTHER WIDEBAND USAGE IN WHICH ONE  | -  |
| GROUND TRANSMITTER UTILIZES THE COMPLETE CHANNEL. THE USABLE   |  |
| 60   |  |
| TN A HIGH CHANNET CAPACITON OF A LARGE NUMBER OF GROUND STALLONS IN A HIGH CHANNET CAPACITY PRECHENCY DIVISION MHITTPLEX SYSTEM.   |  |
| FREQUENCY DIVISION MULTIPLEXING OF THE VOICE CHANNELS WITH SSB   |  |
| IS USED FOR THE VARIOUS GROUND-TO-SPACECRAFT LINKS. THESE SIG-   |  |
| NAIS ARE CONVERTED INTO PHASE MODULATION OF A SINGLE CARRIER IN<br>THE SPACECRAPT AND ARE RETRANSMITTED TO ALL STATIONS IN THIS  |  |
| RIATE CHANNELS   |  |
|  |  |
| TWO-WAY INTERCONNECTIONS. THE ANTENNA USED IS AN ELECTRICALLY DESCHIN DHASED ARRAY, THE EFFECTIVE RADIATED POWER IS 166 WATTS.   |  |
|  |  |
|  |  |
| TRANSMISSIONS PROM AIS GROUND STATIONS AT 6 GHZ  |  |
|  |  |
| 34. PRECISION AND ACCURACY   |  |
|  |  |
|  |  |

|   | 35. SPECTRAL RANGE   |
|---|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION   | 0.475 TO 0.630 MICRONS NA  |
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS   | 15.0 BY 18.0 DRG LIMB-TO-IIMB (7500 NN) PROM GPO-SYNCH ALT   |
| 1, TITLE 2. ACRONYM 3. EXPINO   | SECULTION SPATIAL RESOLUTION   |
| SPIN-SCAN CLOUD-COVER CANERA  |  |
| DATE 110.00   | TOTAL STATE OF THE |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE  | 46, SPECIAL REQUIREMENTS   |
| SUGMI, DR. V.E. UNIVERSITY OF WISCONSIN 608-262-5938  | OPERATES ONLY DURING DAYLIGHT; HIGHLY SENSITIVE TO SWEEP DISTORT   |
| ORGANIZATION  | 17. COMPGNENTS   |
| 9   | -INCH PHOTOMULT TUBE, 5-INCH PARABOLOID, 2-INCH FLAT MIR   |
| 14. FLASH INDEX NUMBER 15. DATE   | 19. VOLUME 50. AVERAGE POWER 51. STANDBY POWER 52. PEAK POWER 53.  |
| NAS5-967  | O. 45  |
| PGM OFFICE  | INTERFLACE SOR 150.  |
| NASA BULLINS  | TO CALIFICATION OF DESCRIPTION OF DESCRIPTION  |
| BARRARA RES CTR GOLETA, CALIFORNIA 12/66  | VATERALIZE RETEINERS   |
| CONTRACTOR | 4 111  |
| IMAGER, TELESCOPE-PHOTOGULTIPLIER ONE-CHANNEL VISIBLE   | 150 KHZ VIDEO BANDWIDTH  |
|   |  |
| MET ATS 1   |  |
| 30 PURPOSE  | 163. ADVAN: AGES AND LIMITATIONS   |
|   | FULL EARTH DISK PHOTOGRAPHY. EARTH SYNCHRONOUS ORBIT ALLOWS  |
| DEG N AND 52 DEG S ALTITUDE ON  | COMPLETE STORM HISTORIES TO BE RECORDED.   |
| BASIS TO PERMIT SURVEILLANCE OF SHORT DURATION WEATHER CHANGES.   | # # C # # # # # # # # # # # # # # # # #  |
|   | I) MET DATA CATALOG FOR ATS, VOL 1. GSFC, OCT 67.***2) SUGAL, V. P. AND DARENT. R. I. PROPOSAT POR A SPIN SCAN CAMERA SYSTEM POR   |
|   | A SYNCHRONOUS SATELLITE. JULY 1965. *** 3) OSTROW, H. AND WEINSTEIN,   |
| 31. PRINCIPLES OF OPERATION   | DECADE OF S  |
| IGH RESOLUTION  | PRESENTED AT SOC OF PHOTO-OPTICAL ENGRS  |
| TELESCOPE HAVING A "PINHOLE" APERTURE FOLLOWED BY A PHOTO-  | SYMP. 23 AUG 68. * * * 4) FILM DATA AVAIL RROM NAT WEATHER RECORD CTR  |
| MULTIPLIER TOBE. THE VIDEO RASTER IS GENERATED IN THE WEST-EAST   | 165. HISTORICAL REMARKS  |
| DIRECTION BY THE SATELLITE SPIN, NOMINALLY 100 REPR. AND IN THE   | The state of the s |
| CONTRACTOR AND TRECTION BY RECHANICAL ILLITING OF THE TRIESCOPE CONTRACTOR AND AND AND THE DRIESCOPE  | The state of the s |
| 10 52 01  |  |
| EAST LIMB. TH   |  |
| 2000 HORIZONTAL (W TO B) TV LINES. THE TOTAL LINE SCAN PERIOD   |  |
| PER REVOLUTION IS 0.6 SEC. A TOTAL TIME OF 20 MIN IS REQUIRED TO  |  |
| SCAN 1 PICTURE AND 2 MIN TO RETRACE. A BACK-TO-BACK MODE IS ALSO  |  |
|   |  |
| SCAN. THE SCAN MAY BE REVERSED AT ANY TIME ONLY IN THE BACK-TO-   |  |
| - 14  |  |
| PRODUCE AN IMAGE ON THE FACE OF AN APERTURE PLATE, THE . 001-INCH   |  |
| LUTION OF 0.1   |  |
| NM. THE SPACECRAFT S  |  |
| ~   |  |
| THE S/C AND PARALLEL TO THE SPIN AXIS OF THE EARTH.   |  |
| STINITER REPLECTED PROM THE RAPTH'S STRPACE AND/OR CLOSES   |  |
| 7,  |  |
| DYNAMIC RANGE = 1000 FOR BRIGHTNESS RESOLUTION  |  |
| 34. PRECISION AND ACCURACY  |  |
|   |  |

| NA NA SYNCH GIRCULAR FOUNTORIAL POSIGRADE.  NA NA SYNCH CIRCULAR FOUNTORIAL POSIGRADE.  8 ANTENNA SYSTEMS, 8 RECEIVERS, 8 TRANSMITTERS, AND MISC EQUIP.  30 LB.  90 WAITS.  100 KHZ BANDWIDTH.   |
|--|
| NA SYNCH CIRCULAR EQUATORIAL POSTI SYSTEMS, 8 RECEIVERS, 8 TRANSMITTERS, AND MISC E 90 WATTS. ANDWIDTH   |
| NA SYNCH CIRCULAR EQUATORIAL POST SYSTEMS, 8 RECEIVERS, 8 TRANSMITTERS, AND MISC E 90 RATTS ANDWIDTH   |
| SYSTEMS, 8 RECEIVERS, 8 TRANSMITTERS, AND MISC ELANDMIDTH  REALTIME, TELEMETRY CONTINUOUS  |
| SYSTEMS, 8 RECEIVERS, 8 TRANSMITTERS, AND MISC EVOLUTIONS.  90 RATTS ANDWIDTH  |
| SYSTEMS, 8 RECEIVERS, 8 TRANSMITTERS, AND MISC E. 90 NAITS ANDWIDTH  |
| SYSTEMS, 8 RECEIVERS, 8 TRANSMITTERS, AND MISC EN MATTS.  90 WATTS.  ANDWIDTH  |
| 90 KAITS. REALTIME_TELEMETRY CONTINUOUS  |
| REALTIME TELEMETRY CONTINUOUS ANDWIDTH   |
| ANDWIDTH REALTIME TELEMETRY CONTINUOUS   |
| Z BANDWIDTH  |
| Z BANDWIDTH  |
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| The state of the second of the |
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| To the country of the control of the |
| REPEATER RYPERIMENT-PINAL REPORT HIGHES AIRCRAFT CO. VASA  |
| CONTRACT NO. 5-9593, PEB 1, 1967, ***2) WH? REPEATER EXPERIMENT  |
| S-C, FINAL REPORT. HUGHES AIRCRAFT CO., NASA CONTRACT NO. 10290. NOV 1967.   |
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| The state of the s |
| SIMILAR TO INSTRUMENT FLOWN ON ATS 3.  |
| a control of the cont |
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| HP REPEATER EXPERIMENT ATS-C, FINAL REPORT. 5-10290, NOV 1967.  ILAR TO INSTRUMENT FLO   |

|  | A A B PA  | ANALYSIS OF THE STATE AND  |
|--|---|--|
| INSTRUMENT RESULTIONAL AERONAUTICS AND SPACE A   | SUME<br>E ADMINISTRATION                                      | 22 AND 135.60 MHZ  |
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS  | ENTER<br>ETTS   | 38 FELD CT V.EW BE BEG LIMB-TO-LIMB (9700 NM) FROM GEO-SYNCH ALT   |
| 1, TITLE   | 2. ACRONYM, S. EXPINO   |  |
| WEATHER FACSIBILE EXPERIMENT   | WEFAX   |  |
| (in Fe cont.)  | 11 / 10 / 60 DOOR   | ALCO OF LIVE   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION  | 8. TELEPHONE  | SINCH CIRCUPATORES OF THE CONTRACT OF A SECOND OF THE COST OF THE  |
| MISHNA, S. GODDARD SPACE PLT   | CENTER 301-982-5774   | The second secon |
|  | 11, TELEPHONE   | 1. CON 1. |
| SS 2   | 301-982-  | ANTENNA  |
| 12. TYPE 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE   | 7   | Seminorary commence of the control o |
| 18 MONITOR 19 AGENCY 20  | 12/66 OPERATIONAL   | 29 LB  |
| OCEOCID ROWN   |   | COURT WEST COURT STATE OF THE S |
| R TOCATION   | 234   353   604   794   795   75   75   75   75   75   75   7 | 20.0 UC 3.1 C C C C C C C C C C C C C C C C C C C  |
| AIRCRAFT CO EL SEGUNDO,  | CALIFORNIA 12/66 NA   | AS PROGRAM   |
| u.   | 1   |  |
| TRANSPONDER  | OND   | 3 KHZ INFORMATION BANDWIDTH  |
| 28, APPLICATION  | 29. SPACECHAFT  |  |
| 30. PURPOSE  | IATS  | normalization in the control of the  |
| PRIMARY-TO DETERMINE OPERATIONAL PEASIBILITY OF DISSEMINATING  | BILITY OF DISSEMINATING                                       | MULTIPLEXING TO ENABLE ADDITIONAL DATA TO BE TRANSMITTED HAS NOT   |
| METEOROLOCICAL DATA AND SATELLITE CLOUD CAMERA PICTURES PROM   | D CAMERA PICTURES FROM A                                      | 3EN COMPLETELY SUCCESSPUL.   |
| CENTRAL SOURCE TO WIDELY SCATTERED RECEIVING UNITS UTILIZING   | EIVING UNITS UTILIZING A                                      | AA EFFER VOES  |
| œ  | TH SYNCHRONOUS SPACECRAFT.                                    | 1) ALLIED RES ASSOC, INC.: NASA/ESSA WEFAX EXPERIMENT EVALUATION   |
|  | OF INCREASING THE AMOUNT OF                                   | REPORT (ATS 1), CHANGE NO.4, N68-12990.***2) MINZNER,R.A.ED: IN-   |
| STATIONS RECEIVING   | APT PHOTOGRAPHS.  | TERIM REPORT ON SAT MET INSTRUMENTS, PM-6/13, NASA-ERC, CAMBRIDGE  |
| 31. PRINCIPLES OF OPERATION  |   | MASS. 196 /***3) ATS B PRESS KIT NASA RELEASE NO.66-308, DEC.  |
| _  | AR TO THE ONE UTILIZED BY                                     |  |
| THE STATE OF THE CASE OF THE STATE OF THE CASE OF THE  | METECACLOGICAL EAPERIMENTS                                    | 2  |
| IN THAI IT HAS NO UNIQUE FLILMG HARDMA   | ARE. IT IS PART OF THE ALS                                    | OT MATERIAL PLANTS AND   |
| THE EAFERIAGE DECETTOR THE 12AN  | ANDRONDER AS A DALA RELAT.                                    | SIGILAR 10 AIS 3 REGAS.  |
|  | THE BND INANGELS AT 155.00                                    | The second secon |
| THE TEST COMPOSITED AS FAST OF THE TAXABLE OF THE T | HA HORDS BREAKING   |  |
|  | IIA APT FORMAT: PROPOSED                                      |  |
| H  | A ATS 1 RELAY: AND PROPOSED                                   |  |
| C  | R FOR ATMOS RES. IN OPERA-                                    |  |
| TION, WEATHER PACSIMILE CHARTS AND SAT   | TELLITE CLOUD COVER PIC-                                      |  |
| TURES ARE SENT PERIODICALLY VIA LANDLINE PROM THE NAT MET CIRC   | NE PROM THE NAT MET CTR,                                      |  |
| CASTA NOTIFIAND, MUS, TO THE NACA AL   | NES GROUND STAILON AT MOJAYS                                  |  |
| ATS 1 FOR RELAY TO ALL PARTICIPATING A   | RESIDENCE FOR THE STATIONS WITHIN THE                         |  |
| RECEDITOR AREA DATLY WEFAY SCHEDILES   | ARE PROGRAMMED TO PROVIDE                                     |  |
| TO THE MAXIMIN NUMBER  |   |  |
| NUMBERING ABOUT 50.  |   |  |
|  |   |  |
|  |   |  |
|  |   |  |
| VHY TRANSMISSIONS FROM ATS GROUND STAT   | TIONS GIVING WEATHER DATA                                     |  |
|  |   |  |
| 34. PRECISION AND ACCURACY   |   |  |
| TRANSPONDER NOISE PIGURE 4.5 DB; BANDWIDTH   | IDTH 100 KHZ  | produced designation of the second of the se |
|  |   |  |

| J.A.E.<br>OLIVETANTERATION<br>OFFIRE   | 0.45 TO 0.65 MICRON INA 40. MILLSRC HER TITEM 31   |
|--|--|
| A DVANCED YIDICON CANERA SYSTEM (TITLECONY)  | SEE ITEM 31  |
| ABSTUATOR  | HIGH ECCENTRIC   |
| GODDARD SPACE FLT CENTER   |  |
| A TESTANT POTTING TO STATES  |  |
| 102/67 PDIGHT  | 135 LB 22 WATES 22 WATES 135 LB THELDING   |
| SA HDOTRS OSSA/SCS 202-962-0581  | SENSITIVE  |
| W JERSEY : 04/67 NA.   | GRAY SCALE ON EACH PIC REALTIME OR DELAYED RYBRY 5-10 MINUTES  |
| IBAGER, 1-INCH WIDE-ANGLE HIGH-RESOLUTION VIDICON 28. APPLICATION  | READOUT TIME 6.25 SEC, VIDEO BANDWIDTH 60 KHZ.   |
| 1 1  | A CONTRACT OF A STATE OF THE ST |
| - TO EVALUATE THE  | SPACECRAFT FAILED TO ACHIEVE DESIRED ORBIT, LIMITING THE   |
| COEDER MOVEMENTS HAVE ON THE SATELLITES POINTING ACCURACY; *** SECONDARY TO PHOTOGRAPH THE ENTIRE EARTH'S DISK TO STUDY THE        | USEFULNESS OF THE EXPERIMENT.  |
| UTILITY OF FUTURE PHOTOS FROM GRAVITY GRADIENT SATELLITES AT HIGH ALTITUDE   | 1) METEOROLOGICAL DATA CATALOG FOR THE ATS, VOL 2, GSFC, 1968.*** 2) PRESS KIT-PROJECT ATS-A, NASA RELEASE NO: 67-71, NASA WASH.D.C  |
| 3. PRICEP is n. operation  | MARCH 1967,***3) EASTMAN, F.H.: TWO CAMERA ADVANCED VIDICON CAM-   |
| THE AVCS IS SIMILAR TO THE CAMERA PLOWN ON NIMBUS 1 AND 2, AND   | PRESENTED AT ATS EUG TRAINING PGM, GSFC, AUG 22-SEPT 30, 1966.   |
| ESSA 3 AND 5. TWO CARERS, IDENIICAL EXCEPT FOR OPTICS ARE ON BOARD ATS 2. ONE CARERA HAS A WIDE-ANGLE (50 DEG), LOW-RESOLU-        | 65. HISTORICAL REMARKS   |
| MM LENS, CAPABLE OF VIEWING THI  | SATELLITE DID NOT ACHIEVE ORBIT.   |
| (3 DEG) HIGH-RESOLUTION 200 MM LENS, WITH 0.5 MI RESOLUTION AT   |  |
| CENTER. PICTURES PROM EITHER CAMERA CAN BE STORED ON A 4-CHANNEL TAPE RECORDER OR RELAYED DIRECTLY TO TRACKING STATIONS. BACH      |  |
| IGH-RESOLUTION VIDI  |  |
| TUBE, FOCAL-PLANE SHUTTER ASSENBLY, FLASH TOBE TO ERASE IRAGE AND PRISM ASSEMBLY, SUN SENSOR AND YOKE, AND PREAMPLIFIER ASSEM-     |  |
| BLIES. THE CAMERA CONVERTS THE OPTICAL IMAGE TO AN ELECTRICAL SIGNAL MATCH IS DROCESSED AND RITHER PRIAYED DIRECTLY TO PARTH       |  |
| INHEREN  |  |
| WHICH PERBIES A NOBLNAL 6.3 SEC FRAME SCAN TIME. CONCURRENT WITH<br>SHUTTER ACTUATION A 16-INCREMENT GRAY SCALE IS INCLUDED AT THE |  |
| -  |  |
| 67   |  |
| 32. PHENOMENA OBSERVED CLOUD COVER OF EARTH VIA REFLECTED VISIBLE SOLAR RADIATION  |  |
| 33. MEASUREMENT RANGE  14. TO 10.000 POONT-I ARREPORTS   |  |
| PRECISION AND ACCURACY   |  |
| RESOLUTION APPROXIMATELY 800 LINES WITH 16 LEVELS OF GRAY  |  |

| SKIDJA ENI DECIMO  | 38. SPECTRAL BANGE  |
|--|---|
| NATIONAL AERONAUTICATION H FERONAUTICATION H FERONAUTICATION   | 6,212 TO 6,301 GHZ 25, MHZ  |
| CAMBHIDGE, MASSACHUSETTS   | 18.0 BY 23.0 DRG LIMB-TO-LIMB (9500 NM) FROM GEO-SYNCH ALT  |
|  | UTION   |
| HICROHAVE TRANSPONDER  | NA NAME OF TAXABLE AND  |
| 11/10/6  | HIGH ECCENTRIC  |
| S. TELEPHONE DIOCRAL INVESTIGATOR CONDAINS BY CRUMPD 201-001-001-001-001-001-001-001-001-001-  | 48, SPECIAL NECULPEMENTS  |
| TO ORONIESTION   | 14 Confidence 13  |
| 12 CONTRACT 13 COLUMBAR 13 1 CA I NO MINER 13 STATE  | NDER, ANTENNA   |
| STAGE TOWNS OF THE STATE OF THE | 20. AVERAGE P   |
| 19, ASENCY C. C. F. G. W. OFFICE   | 15 NIERCERENCE 18 NUCLEAR   |
| BURKE, J.R. (NASA HDOTRS OSSA/SCS 202-962-0581   | SOURC/SEN IS CALMENTON IS COATA RECOVERY IN ERFOLENCY OF ORSERVATION  |
| DO, CALIPORNIA 04/67   | REALTIME TELEMETRY  |
| 6-GHZ (RECEIVE) 4-GHZ (TRANSMIT) SHP   | NA  |
|  |   |
|  | to adventages and limitations   |
| PRIMARY- TO EVALUATE SIMULTANEOUS TRANSMISSION OF VOICE, TELE-   | SATELLITE DID NOT ACHIEVE PROPER ORBIT; STABILIZATION DID NOT   |
| -  | MODAL PROPERTY.   |
| SATELLITE MOTION ON MULTIPLE ACCESS BOUIPMENT AND COMPARE  | T DEVELOPMENT PLAN-ATS, GSFC, GREENBELT, AD.  |
|  | HTTZ) RELECTOLUCIONE DATA CATALOG FOR ALS VOL 2. GSFC. GREENBEET   MD., 1968.***3) TECHNICAL DATA REPORT FOR THE ATS PROGRAM, GSFC. |
|  | N 5, 1968.  |
| THIS SYSTEM IS SIMILAR TO THOSE PLOWN ON ATS-1 AND ATS-3. RE-  |   |
|  | 64. ASTURIOR, ANHARAS   |
| CATIONS TRANSPONDER TO PROVIDE A SYSTEM ELEMENT CAPABLE OF AC-   | SIMILAR TO THAT ON ATS 1 AND 3. SATELLITE DID NOT ACHIEVE ORBIT.  |
| CEPTING AND HANDLING ANY TYPE OF COMMUNICATIONS TRAFFIC OR WIDE-<br>BAND COMMUNICATIONS, THE PRECUENCY TRANSLATION MODE IS DESIGNED  | ( ) to Market   |
| PRIMARILY POR TELEVISION OR OTHER MIDEBAND USAGE IN WHICH ONE  |   |
| GROUND TRANSMITTER UTILIZES THE COMPLETE CHANNEL. THE USABLE ARANDATOM IS 25 MM7 THE MILITADE ACCESS MODE IS DESIGNED TO   |   |
| PERMIT THE INTERCONNECTION OF A LARGE NUMBER OF GROUND STATIONS  |   |
| IN A HIGH CHANNEL CAPACITY PREQUENCY DIVISION MULTIPLEX SYSTEM.  |   |
| CHANNELS WIT   |   |
|  |   |
| INTO PHASE MODULATION OF A SINGLE CARRIER IN THE SPACECRAPT AND ARE RETRANSMITTED TO ALL STATIONS IN THIS FORM, EACH GROUND  |   |
| STATION SELECTS THE APPROPRIATE CHANNELS FROM THE RECOVERED  |   |
| SHE THE THE  |   |
| CONNECTIONS. THE ANTENNA USED ON THIS FLIGHT WAS DIRECTLYE HORN. AND DIPPERED FROM ATS 1.  |   |
|  |   |
| Ω.   |   |
| The first state of the first sta |   |
| PRECISION AND COURTER  |   |
| VALUE A MARKETANIA MAN AND AND AND AND AND AND AND AND AND A   |   |
|  |   |

ATS 3

| INSTRUMENT RESUME NATIONAL AERONAUTISTA AND SWEED ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBIBLIOGE, MASSACHUSETTE   | 10.4 TO 0.7 MICRON SERVING SELECTION SERVING SELECTION OF TABLETO TIMPLED TIMPLED SELECTION OF SELECTION ATTENDED SELECTIONS SELECTI |
|---|--|
|   | 8 .<br>9 .<br>9 .  |
|   | SYNCH CIRCULAR BO  |
| R 10 ORGANIZATION IT LABS   | IMAGE DISSECTOR, SCANNING APERTURE, 12 STAGE ELECTRON MULTIPLIER   |
| 13. CONTRACT NUMBER 14. FLASH INDEX NU NAS 5-9671   | 20 LB 0.38.CU FT 20 WATTS  |
| 18. MONITOR 10. AGENCY 20. POW OF FICE PARTIES 12.02 – 9.05 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 20 - 17 - 20 - 17 - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2   |
| OUSTRIAL LABS FORT WAYNE, INDIANA 11/67   | REALTING TRIENSTRY BYERY   |
| INAGER, 1-INCH VISIBLE ELECTRICALLY-SCANNING PHOTOCATHODE UNC   | SS THAN 10   |
| NET ATS 3   | A A D.V. (1972) S. (1971) C. (1971) C. (1972)  |
| PRIMARY- TO TRANSHIT IN REAL TIME, DAYLIGHT CLOUD COVER INFORMA-  | IN OVERCOME  |
|   |  |
| ENVIRONMENT, I.E. HOW ELECTRICAL SCANNING, AS OPPOSED TO MECHANICAL SCANNING, WILL PERFORM IN SPACE.  | F.: THE APPLICATIONS<br>MERA EXPERIMENT, NASA  |
| 31. PRINCIPLES OF OPERATION ,   | TN-4186, NOV. 1967.***2) ATS TECHNICAL DATA REPORT, SECTION 8.5,<br>GSFC, JUNE 68.***3) METEOROLOGICAL DATA CATALOG FOR THE ATS,VOL 2:   |
| A SIMILAR SYSTEM IS SCHEDULED TO FLY ON NIMBUS D, AND IS FLYING ON NIMBUS 3. THE 1-INCH IMAGE DISSECTOR HAS A RESOLUTION CADABIL.   | GSPC, 1968.***4) DATA AVAILABLE FROM THE NATIONAL WEATHER RECORDS  |
|   | 15 HISTORIAL REMARKS   |
| TALES A PHOTOCETHODE THAT IS MASKED OFF TO FORM A SLIT SLIGHTI<br>WIDER THAN A LINE, A SCENE IS OPTICALLY POCUSED ON THE PHOTO-   | STALLAR TO NIRBUS D AND 3 IDCS.  |
| CATHODE AND PHOTOELECTRONS ARE EMITTED PROM THE SURFACE IN PRO-<br>PORTION TO THE INCIDENT ILLUMINATION, THE PHOTOELECTRONS ARE   |  |
| <b>—</b> (  |  |
| HEANS OF MAGNETIC DEPLECTION, THE APERTURE SAMPLES THE BLECTRON IMAGE AND A SECONDARY-PRISCION PLECTRON-MILITALIER SECTION AM-  |  |
| THE CAMERA  |  |
| _   |  |
| MERA SCANS A PROGRESSION OF LINES, ONE PER SATELLITE  |  |
| TION, UNITL A CONFLETE HANTEN IS GENERATED, COVERAGE FROM NO NO SO S LATITUDE IS OBTAINED, WITH A GENOUN RESOLUTION AT THE MARKEN OF 3 M MM SCAN TIME CAN REPUBLIED DEPOLITION. |  |
| THE SPIN AKIS OF THE EARTH.   |  |
| REFLECTION OF THE BARTH'S SURPACE AND CLOUD COVER   |  |
| 100 TO 1000 POOT-LAMBERTS   |  |
| 40 DB AT 10,000 POOT-LAMBERTS   |  |
|   |  |

| INSTRUMENT RESUME   | 36. SPECTRAL RANGE 58. SPECTRAL RESOLUTION 37. TIME CONSTANT 6.212 TO 6.301 GH2 25 MH2   |
|---|--|
| NATIONAL AERONALTISA AND SYBECE BAMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | v 23.0 DEG LIMB-TO-IIMB (9500 N  |
|   | AFBOLLUTION 41, SPATIAL RESOLUTION   |
| E TRANSPONDER   |  |
| (TITLE CONT.)  11/10/69 0005  | 42 POWTING ACCUMANY 43 POINTING RATE 44. ALTITUDE 45. INCLINATION OF TORSANDE SAVICE CTRUITABLE POLITATION TALED TO STORADE  |
| GATOR 7, ORGANIZATION 8. TELEP  | 1 1  |
| DARCEY, B.J. GODDARD SPACE FLT CENTER 301-982-4094  | 47. CONPONENTS   |
| 1971)   | ANSPONDER, ANTENNA   |
| 12. THIPE IS CONTRACT NUMBER IN FLASH INDEX NUMBER 15. DATE 16. DATE 11. STATUS 11. THIPE IS THE INDEX NUMBER 15. DATE 11. STATUS   | 50. AVERAGE P  |
| 19. AGENCY 30.PGM OFFICE 2  | SO INTERPRESION SO INTERPERSON   |
| BURKE, J. R.   NASA HDQTRS   OSSA/SCS  202-962-0581   | SOURC/SEN SENSITIVE E. CATA BECOMES  |
| APT CO EL SEGUNDO, CALIFORNIA 11/67 NA  | REALTIME TELEMETRY CONTIN  |
| TO INSTRUMENT TYPE  TO A STATE OF THE STATE | 00. TELEMETRY NECOLARMENTS NA  |
| LICATION 78 SPACECRAFT  |  |
| CONN<br>Warnenge  |  |
| I- TO BVALUATE SIMULTANEOUS TRANS   | CONTRACT TO THE PROPERTY OF TH |
| SEVERAL   |  |
| ***SECONDARY- TO DETERMINE EPPECTS OF DOPPLER SHIFT DUE TO  | 1067 ***   |
| LEGUAT  | TECHNOLOGY   |
|   | BELT, MD. * * * 3) TECHNICAL DATA REPORT FOR THE ATS PRO   |
| THE SYSTEM IS STATILED TO THOSE PLOWN ON ATS-1 AND ATS-2 PECETV-  | GSFC, 1968.  |
| LING-WAVE-TUBE POR  |  |
| LIPIERS ARE USED IN CONJUNCTION WITH A DUAL HODE COMMUNICATIONS   |  |
| TRANSPONDER TO PROVIDE A SYSTEM ELEMENT CAPABLE OF ACCEPTING AND  | THE SYSTEM IS SIMILAR TO THOSE PLOWN ON ATS 1, 2, 4 AND 5.   |
| IS DES  | of Children and Ch |
| POR TELEVISION OR OTHER WIDEBAND USAGE IN WHICH ONE GROUND  |  |
|   |  |
| IS 25 MRZ. THE MULTIPLE ACCESS MODE IS DESIGNED TO PERMIT THE TWENDPONED AND CHANTONS IN A HIGH   |  |
| TIPLEX SYSTEM. THE  |  |
| PONDER SERVES AS A TELEPHONE RELAY. PREQUENCY DIVISION MULTI-   |  |
| PLEMING OF THE VOICE CHANNELS WITH SSB IS USED FOR THE VARIOUS  |  |
| GROUND-IO-SERVECARFI LIBAS. INDSE SIGNALS ARE CONTENTED IN PRASE RODULATION OF A SINGLE CARRIER IN THE SPACECRAFT AND ARE   |  |
| 2   |  |
| SELECTS THE APPROPRIATE CHANNELS PROM THE RECOVERED BASEBAND  |  |
| LY DESPUN PHASED A  |  |
| CIVING 15-18 DB OF GAIN. THE EPPECTIVE RADIATED POWER IS 830 H.   |  |
| TRANSMISSIONS PROM ATS GROUND STATIONS AT 6 GHZ   |  |
|   |  |
|   |  |
| 34. PRECISION AND ACCURACY  |  |
|   | THE PROPERTY OF THE PARTY OF TH |
|   |  |

| 1. (A. S. S. L. L. S. S. L. L. S. S. L. L. S. S. L. L. S.   | 38. SPECTRAL RESOLUTION 37. TIME CONSTANT   |
|--|---|
| NATIONAL ALAUNAUTION CONTRATION  |   |
| BELATHOMICS RESEARCE CENTER<br>CANGELLISE, MASSACHOSE FES  | 36 FFE. D ST VIEV. SO GROUND SWATH  |
| 1. TITLE   | TENTAL SPATIAL RESOLUTION   |
| LE   |   |
|  | INC RATE 44 ALTITUDE 45, INCLINATION  |
| The state of the s | 4. DEG. PECH. TO THE POSTGRADE SYNCH CIRCULAR EQUATORIAL POSTGRADE  |
| GODDARD SPACE FLT CENTER   |   |
| The state of the s |   |
| HILTON, G. E. GONTRACT NUMBER (4. PLESHINDLY NUMBER 19-21/6) INC. 114 CONTRACT NUMBER (4. PLESHINDLY NUMBER 19-21/6) INC. 217-11.8   | PLAIT ORM ELECTRONIC PACKAGES, BATTERI, DIPOLE ANTENNA.   |
| 11/67  | 45 LB 90 WATTS  |
| 1.5. AGENGY  | St. N.T. C. C. O. D. SERVER ST. C. INTERFERENCE ST. INTERFERENCE SB. SHIELDING  |
| INASA HDOTRS OS  | SOURC/SEN  52. CAL-PRINTED.  102. PREQUENCY OF OBSERVATION  |
| AIRCRAPT CO EL SEGUNDO, CALIFORNIA 11/67   | NA  |
| RANSPONDER, VHP  | 56 BITS PER SECOND PHASE SHIFT KEYED  |
| I'20, SPACECHAET   |   |
| BELL OCEAN, NAV  | La. ADVANTALES AND LIMITATIONS  |
| PRIMARY - TO DEMONSTRATE THE FEASIBILITY OF USING THE OMEGA<br>NAVIGATIONAL SYSTEM IN CONJUNCTION WITH SYNCHRONOUS SATELLITES  | COMPLEX AND BULKY LOCATION-COMPUTING EQUIPMENT CAN BE LOCATED AT CONVENTENT CENTER RATHER THAN AT PLATFORM.                   |
| TO ESTABLISH A GLOBAL LOCATION AND DATA COLLECTION SYSTEM.   | RORN 7-F YOU SHE MAN  |
|  | ***2) ATS TECHNICAL DATA REPORT, GODDARD SPACE FLIGHT CI  |
| 31. PRINCIPLE E. OF CHERACION  | TER, GREENBELT, MD. SECTION 8.4.1, JUNE 1968.***3) LAUGHLIN, C. ST AL. OMEGA DOSTITON-TOCATION BORTOMENT (ODIE) DESCRIPTED AT |
| AN OPERATIONAL SYSTEM CONSISTS OF: (1) AN OPLE CONTROL CENTER;   | ATS SYSTEMS ENGRS TRAINING PROGRAM, GSPC, SEPT. 1966.   |
| (2) A SYNCHRONOUS SATELLITE; AND (3) THE OPLE PLATFORM ELECTRONIC  | SE LICTACION DESIRENCE  |
| DIRING A TYPICAL INTERROGATION PERIOD. GSPC TRANSMITS A PRE-PRO-   | טטי דוט טחולאך אנוואחאס   |
| GRAMMED PLATFORM INTEREGRATION SEQUENCE WHICH IS RELAYED (VHF)   | 61, DIAGRAMS  |
|  |   |
| AT 149.22 BHZ AND TRANSMITS AT 135.6 BHZ WITH A 40-WAIT MAX OUT-   |   |
| HAS ITS OWN BINARY CODE ADDRESS. APTER RECEIPT OF THEIR OWN  |   |
| SED PEP'S SI   |   |
| TRANSHIT INGIR ASSIGNED ACQUISITION REFERENCE A/R SIGNALS, AFTER<br>THE ACOUTSITION PERIOD, THE A/B TONE IS MODULATED WITH METEORO-  |   |
|  |   |
| ING THE DATA TRANSMISSION PERIOD, THE A/R TONE IS REDUCED IN   |   |
| THIS MODE, TWO PAIRS OF VLF OMEGA SIGNALS ARE RECEIVED BY THE  |   |
| RECEIVERS ON THE PLATFORMS AND CONVERTED TO WHY FOR TRANSMISSION OF AME AND THE MENT DEPORT PRINCE PROCESS AND THE HELD  |   |
| EALLY FRASE BELWEN INC.<br>E AND THE INTERSECTION C  |   |
| LINES GIVE THE LOCATION TO WITHIN 1 NI (DAYTIME), 2 MI (NIGHT).  |   |
| DATA FROM OBSERVATION PLATFORMS  |   |
| 33. MEASUREMENT RANGE  |   |
| 34, PRECISION AND ACCURACY   |   |
| POSITION TO ONE MILE IN DAYTIBE; TWO MILES NIGHTIME  |   |
|  |   |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  | 36. SPECTRAL RANGE 36. SPECTRAL RESOLUTION 37. TIME CONSTANT 0.390 TO 0.700 MICKON   |
|--|--|
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS  | 15.0 DEG LI  |
|  | AESOLUTIONIAI, SPATIAL RESOLUTION  |
| SPIN-SCAN CLOUD-COVER CAMERA   | 0,006 DEC 2 NM AT CENTER   |
| 11/10/69   | SYNCH CIRCULAR   |
| R 7. ORGANIZATION  | 46. SPECIAL REGULAREMENTS  |
| SUCHAL DIG. V. E. UNIVERSITY OF MISCONSIN BUS-262-5938  D. CONNUESTICATOR OF UNIVERSITY OF MISCONSIN BUS CONNUESTICATION   | A3. COMPGN2'V?   |
| PARENT DR. R. J. UNIVERSITY OF HISCONSIN 608-262-5939  | TELESCORE, 3. PHOTOMULTIPLIER LIGHT DETECTORS, STEP DRIVE MECHANISM to WEIGHT MECHANISM IN PRESENTED THE MECHANISM   |
| 11/67 OPERATIONAL  | 23 LB 0,54 CU PT 10 WATTS 22 MATTS   |
| J.R. MASA HOOTES   | STOCK WANTON   |
| BANT TYPE  | REALTIME TELEMETRY   |
| IMAGEB, THREE 1-INCH PHOTOMULTIPLIBES, VISIBLE-COLOR  38 APPLICATION  28 SPACEGRAFT  | 500 KBIT, 3 TDM CHANNELS OF 150 KBIT EACH.   |
|  |  |
| - TO OBTAIN HIGH RESOLUTION COLOR PHOTOGRA   | REDUCTION IN SIZE AND WEIGHT OVER COMBINED TELESCOPE-PHOTOMULTI-   |
| RONOUS ALTITUDE SO THAT CLOUD DEVELOPMENT, CLOUD DISPLACEMENTS, AND IN THE TERBINATOR ZONE, CLOUD ALTITUDES, CAN BE DETERMINED   | PLIER TUBE ASSEMBLY.   |
| POR USE IN STUDIES OF TROPICAL CONVECTION, *** SECONDARY - DETERMINE   | 1) ATS METEOROLOGICAL DATA CATALOG. GSPC. ***2) MINZNER, R.A. ED:  |
| HORIZONTAL EXTENT OF OCEAN CURRENTS; SCATTERING OF THE ATMOS-  | INTERIM REPORT ON SATELLITE MET. INSTRUMENTS, PM-6713, NASA/ERC, DR67 ***3) SHOMI V AND DARBAT D I . DROBOSAT AND SHEDSTEWENT  |
| 31. PRINCIPLES OF OPENATION  | UNIV. OF WISC. NOV   |
| SPIN SCAN CAMERA IS AN ADVANCEMENT OVER  | SVILLE, N.C. FOR B/  |
| PROW THE BARTH IS GATHERED BY A 5-INCH DIANETER F/3 DALL-KIRKHAM   | BUSZATS DATA UTILIZATION CENTER, GSEC, FOR COLOR,  |
| TELESCOPE AND POCUSED ALTERNATELY ON A SET OF THREE 0.0015 INCH  | ADVANCEMENT OVER MONOCHROMATIC SPIN-SCAN CAMERA (SSCC) ON ATS 1.   |
| DIABLETE FIELD-DEFINING AFERTURES. AN AFERTURE PASSES EITHER RED, GREEN, OR BLUE DETERMINED BY A COMBINATION OF THE NATURAL  | CLANCE CANADA CA |
| CUTOFFS OF THE DIFFERENT DETECTOR PHOTOCATHODES, CORNING FILTER-   |  |
| GLASS DIVERGING LENSES AND INTERFERENCE FILTERS. THE SPINNING MOTION OF THE SPACECRAPT PROVIDES THE CAMERA SCAN PARALLEL TO  |  |
| CREMENT IN LATITUDE FO   |  |
| IN 2400 SCAN LINES. WITH A SPIN RATE OF 100 RPM, THE TIME TO   |  |
| COVER ONE FRAME IS 24 MINUTES. RETRACE TAKES 4 MINUTES. THE SCAN CAN ALSO BE OPERATED IN A BACK-TO-BACK MODE. OPERATION  |  |
| TO-SOUTH   |  |
| ATION BUT DUKING KEIKALE THE SOUTH-TU-NUKTH STEF IS AT THE SATE RATE AS THE FROM THACE AND USEFUL VIDEO IS PRODUCED. THE OUT-PUTS FROM THE THREE PHOTOTHES ARE MULTIPLEXED AND TRANSMITTED TO EARTH OVER THE SHF WIDE-BAND LINK. |  |
| 13. PHENOMENA N. A. C. C.  |  |
| INTENSITY OF EARTH'S SPECTRAL REFLECTION IN THE BLUE, GREEN, RED. 32 MEASUREMENT ANGE  |  |
| 194. PRECISION AND ACCURACY  |  |
|  |  |
|  |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS           | 135.6 TO 149.22 HRZ NA  135.6 TO 149.22 HRZ NA  38. FRELD OF VIEW  17.0 DRG LINB-TO-LIMB (9700 NN) PROM GEO-SYNCH ALT |
|--|---|
| 1, TITLE 2. ACRONYM 3. EXPINO  | COLDE NESOLUTION CT EFFT AL RESOLUTION  |
| VHP TRANSPONDER (TITE CONT.)   | AN NA NATIONAL POINTING RATE SE ALTITUDE . NO. 1947 . 1   |
| 11/10/69   | S   |
| GODDARD SPACE PLT CENTER   |   |
| 10. ORGANIZATION   | O REPORTED CYCEPENC O DECETUEDS O TERRORISMENT MISC DOLLED  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATE 16. COMPANY STATUS   | 0   |
| NAS5-10290   | WASALV  |
| 19. AGENCY   | 194 INTERNETALNE 55. INTERPLEMENT F 50. INTERFERENCE 57. INTERPENCE NOT TO SERVE SHIELDING                            |
| BUNKE J. K.  22. VENDOR  22. VENDOR  | SOUNG A SALIBRATION '42 DASSERVATION '42 DASSERVATION   |
| ITY, CALIFORNIA 11/67  | NA TELEVISTRIA RECONSENSIA  |
| ACTIVE PREGUENCY TRANSLATION   | 100 KHZ BANDWIDTH   |
| COME OFFISH  |   |
|  | 23 A.V. W. A. A. S. W. T. Y. 10 N.S.  |
| PRIMARY-DEMONSTRATE PEASIBILITY OF PROVIDING CONTINIOUS VOICE COMMUNICATIONS LINK BETWEEN A GROUND CONTROL STATION AND AIR-    | MAJOR DIFFERENCE FROM ATS 1 CONFIGURATION IS THE ADDITION OF A STALL AFFENDATOR TO EACH OF THE 8 ASSENBLES.           |
| BILITY OF OPERATING A METEOROLOGICAL NETWORK IN WHICH DATA FROM  | 1) WHY REPEATER EXPERIMENT FOR ATS C, PINAL REPORT FOR CONTRACT   |
| SENSOR PACKAGES ARE COLLECTED AT A CENTRAL STATION AND THEN  | RCRAPT CO, R  |
| TRANSMITTED TO THE NETWORK ALL VIA SATELLITE.  | 1967.***2) VHF REPEATER EXPERIMENT, FINAL REPORT-NASA CONTRACT<br>NO. NAS 5-10290. HUGHES ATRCRAPT CO. PEB 1967.      |
| THE INSTRUMENT IS AN ACTIVE PREQUENCY TRANSLATION LINEAR REPEAT-   |   |
| ER THAT RECEIVES AT A PREQUENCY OF 149.22 MHZ AND TRANSMITS AT A PRECHENCY OF 135 K MHZ. THE REPERTER ROTH RECEIVES AND TRANS- | 68, HISTOFICAL PEWARKS  |
|  |   |
|  | 61 DIAGRAMS   |
| TRANSMITTER IS A LINEAR AMPLIFIER, AS OPPOSED TO THE SATURATED   |   |
|  |   |
| TO COMPENSATE FOR THE  |   |
| TIVE POSITION OF BACH DIPOLE ANTENNA. THE OUTPUT OF EACH RE-   | •   |
| EARTH. THE 8 RECEIVER OUTPUTS ARE SUMMED TOGETHER, FILTERED AND  |   |
| NVERTED TO A 29.95 MHZ IP. THE IF IS PASSED THROUGH  |   |
| CRISTAL FILTER TO LIGHT THE RECEIVER BAND MIDTH TO TOURHZ. THE TP IS THEN AMPLIPIED AND UP-CONVERTED. EIGHT EGUAL OUTPUT       |   |
| NG, 7-WAY HYBRID.  |   |
| THE SIGNALS IS THEN AMPLIPIED, PHASE SHIPTED AND FURTHER AMPLI-  |   |
| H  |   |
| RAPT CLOCK.  |   |
| DATA PROM OBSERVATION PLATPORMS AND GROUND CONTROL STATIONS  |   |
| 33. MEASUREMENT RANGE  |   |
| 34. PRECISION AND ACCURACY   |   |
| RECEIVER NOISE PIGURE < 4.0 DB   |   |
|  |   |

LE SPECTEAL PERD JAMES T AL CONSTANT

| IOITAN  | INSTRUMENT RESUME NAL AERONAUTICS AND SPACE ADMINISTRATION   | 135.0<br>AND 135.0   |
|---|--|--|
| *****   | ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 17.3 DEG LIMB-TO-LIMB (9700 NM) FROM GEO-SYNCH ALT   |
| 1. TITLE  |  | RENALVION 4: SPATIAL RESOLUTION  |
| WEATHER PACSIMILE EXPERIMENT                            | PERIMENT A PESUME S. C. CALLER   | A POINT OF COUNTY OF POINT OF RATE AS A THIRD STATE OF THE COUNTY OF THE |
|   | 69/0   | SYNCH CIRCULAR EQUATOR   |
| 6. PRINCIPAL INVESTIGATOR                               | 7. ORGANIZATION 8. TELEPHONE   | 46, SPECIAL REOU, REMENTS  |
| HOLERS, D.W.  | PSSA/NESC 301-440-7405   | (a) Components   |
| ALSHNA. S.  | DDDARD SPACE PLT CENTER  | S PONDER. ANTENN   |
| 12. CONTHACT 13. CONTRACT NUMBER                        | 14. FLASH INDEX  | 49. WEIGHT AS VOLUME 50. AVERAGE POWER 51. TIANOBY JOHN CE PLAK POWER SI MITBE   |
| OCTINOM "   | 11/67 OPERATIONAL  |  |
| BURKE, J.R.   | DOTRS 05SA/SCS 202-962-  | ATTENDED TO THE TOTAL OF THE TO |
| 22. VENDOR  | - 1  | 159. CALLGRAT TILL GO. DATA ARCOVERY L. A. GOLD DE GO. CALLGRAY L. A. GOLD DE  |
| 26 INSTRUMENT TYPE                                      | KL SEGUNDO, CALIFORNIA   11/6/1 NA   | A PROUK S THOURS AND THE SET OF T |
| TRANSPONDER, VHF  | ONG.   | 2 KHZ INFORMATION BANDWIDTH  |
|   | CECRAFT  |  |
| 30. PILEOCO   | ATS 3  | STATE OF A STATE OF S |
| 1   | TO TRANSMIT PACSIBILE WEATHER DATA THROUGH THE ATS 3   | MORE SENSITIVE TO SMALL SIGNALS THAN ATS 1 TRANSPONDER   |
| SATELLITE TO PARTICI                                    | PARTICIPATING GROUND STATIONS ** * SECONDARY - TO TRANS-   |  |
| MIT SELECTED SPIN-SC                                    | MIT SELECTED SPIN-SCAN CAMERA PICTURES VIA SATELLITE TO APT  | JEC E7 ON HOTHERD SOFT   |
| THE AMOUNT OF DATA AVAILABLE TO APT                     | GROUND READOUT STATEOUS-TO EAFLORE FEASIBLEIT OF LACREASING<br>THE AMOUNT OF DATA AVAILABLE TO APT GROUND STATIONS PROM ESSA   | () AIS C PRESS AIT, NASA RELEASE NO. 0/-1/10, UCI., 190/.****/) CORRIGAN, J.P.: THE WHY EXPERIMENT, PRESENTED AT ATS SYSTEM  |
| AND NIMBUS SATELLITES.                                  |  | GSFC, AUG  |
| 31. PRINCIPLES OF OPERATION                             |  | WEATHER PACSIMILE EXPERIMENT. PRESENTED AT ATS SYSTEMS ENGRS.  |
| THIS WEFAX EXPERIBENT, WHICH IS SIMI.                   | THIS WEFAX EXPERIEENT, WHICH IS SIMILAR TO THE ONE UTILIZED BY ATC 1 TO THEFRENENT PROMOTERS ATC 3 METERRORULOTICAL EXPERIMENTS  | TRAINING PROGRAM, GSFC, SEPT 66.   |
| IN THAT IT HAS NO UNIQUE PLYING HARDW                   | ARE. IT IS PAR   | 68 HSTO-101 PARTY  |
| A THE EXPERIENT AND USES THE WHE TRA                    |  | SIMILAR TO ATS 1 WERAX.  |
| HELD TRABSPORDER RECKIVES AT 149.22                     | TRABSPORDER RECKLIES AT 149.22 ENZ AND INANSELLS AT 130.00   | A DIAMATATATATATATATATATATATATATATATATATATA  |
| TRIBUTION OF WEATHER                                    | DATA DIRECT TO APT   |  |
| SYNCHBONOUS ALTITUDE EARTH PICTURES V                   | EARTH PICTURES VIA APT FORMAT; AND PROPOSED  |  |
| TION, WEATHER FACSIMILE CHARTS AND SA                   | TELLITE CLOUD CO   |  |
| TURES ARE SENT PERIO                                    | LINE FROM  |  |
| RETEORCIOGICAL CENTER                                   | CENTER, ESSA, AT SUITLAND, ND., TO THE NASA ATS  |  |
| CENTER TRANSMITS THE DATA                               | TO THE SPACECRAPT AT THE RATE OF   |  |
| SCANS PER HINUTE, AND THE ATS THEN RE                   | D THE ATS THEN RELAYS THE DATA. PARTICI-   |  |
| THEM POR DSEFUTNESS.                                    | PATING APT STATIONS RECEIVE THESE TRANSHISSIONS AND EVALUATE<br>THEM FOR INSEPTINESS. COPIES OF THE RECEIVED ITEMS ARE SENT TO   |  |
| GODDARD FOR CORRELATING QUALITY                         | ING QUALITY WITH FACTORS SUCH AS TRANSMIS-   |  |
| SION DISTANCE AND ANTENNA ANGLE.                        | TENNA ANGLE. POTENTIALLY 100 TO 150 RECEIV-<br>LUDED IN THE AREA OF COVERAGE.  |  |
| 32. PHENOMENA OBSERVED                                  |  |  |
| VAP TRANSBISSIONS PROM ATS GROUND 33. MEASUREMENT RANGE | OR ATS GROUND STATIONS GIVING MEATHER DATA   |  |
|   |  |  |
| 34. PRECISION AND ACCURACY                              | The state of the s |  |
| TRANSPONDER NOISE FIGURE 4.5 DB, BANI                   | GURE 4.5 DB, BANDWIDTH 100 KHZ   |  |

ATS 4

| AVAILABLE TO PREVENT STRAY LIGHT FROM ENTERING THE CAMERA'S  FIELD OP VIEW WHILE IMAGING NIGHTTIME SCENES. THE INAGE ORTHICON SATURATES UNDER NONINAL FULL MOON CONDITIONS. WHEN THE SCENE TILUMINATION IS ABOVE THIS LEVEL, ATTENDATION, IN THE PORT THE TWO TARERED, DOUBLE CYCLE, COUNTER OFTATION, IN THE PROPERTY FILL THEY TARED BY THE CAMERA. THE OFTATION OF THE PRIT GENERATES A SIGNAL PROPORTIONAL TO THE OPTICAL PATH, THE PRIT GENERATES AN AUTOMATIC LIGHT CAMERA. THE SIGNAL PROB THE PLITERS UNTIL AUTOMATIC LIGHT CONTROL SIGNAL PROB THE PLITERS UNTIL AUTOMATIC LIGHT CONTROL SIGNAL PROB THE PRITTERS UNTIL ANGLE BY MEANS OF GROUND COMMAND. STEPS OF 0.1 DEG THROUGH AN ANGLE OF PLUS-MINUS 12.5 DEG IN BOTH PITCH AND ROLL ARE POSSIBLE, THUS THE CAMERA IS ABLE TO TRACK AREAS OF METEOROGICAL INTEREST KNOWING THE SPACECRAPT ATTITUDE AND THE LOCATION OF THE DESTRED VIEWING AREA. PULL BARTH COVERAGE CAN BE ACHIEVED BY |
|---|
| J. THE CONTROL AND COURT AND CLOUD COVER AN EASUREMENT RANGE TO 10000 POOT-LAMBERTS   |
| 94. PRECISION AND ACCURACY  |
| 34. PRELISION AND ACCORACT  |

| INAGE ORTHICON, OPTICS, SUNSHADE  A AVERAGE FOWER SISTAMOST FOWER SISTAMOST FOWER SIGNING  A AVERAGE FOWER SISTAMOST OF SIGNING SISTAMOST FOWER SIGNING  A AVERAGE CALE OF SIGNING SIGNING SISTAMOST FOWER SIGNING  GRAY-SCALE CALIBRATOR REALTIME TELEMETRY CONTINUOUS  GO KHZ VIDEO BANDWIDTH  FOR KHZ VIDEO BANDWIDTH  A REPERENTED OF A DECADE OF SPACE  CAMERA SYSTEMS DEVELOPEMENT FOR METEOROLOGY: PRESENTED AT SOCIETY  OF PHOTO-OPTICAL INSTRUMENTATION BNGINEERS 13TH ANNUAL TECHNICAL  SYMPOSIUM, AUG. 1968.***2) SHAW, D.B.: THE INAGE ORTHICON CAMERA.  SYMPOSIUM, AUG. 1968.***2) SHAW, D.B.: THE INAGE ORTHICON CAMERA.  SYMPOSIUM, AUG. 1968.***2) SHAW, D.B.: THE INAGE ORTHICON CAMERA.  SYMPOSIUM, AUG. 1968.***2) SHAW, D.B.: THE INAGE OF SPC., SEPT.  SPACECRAPT PAILED TO REACH SYNCHRONOUS ORBIT | 8) DIAGRAMS |
|--|-------------|
|--|-------------|

| TAN  | INSTRUMENT RESUME NATIONAL ARRONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER   | NO   | 6.301         GHZ         30.         MHZ           30.         GROUND SWATH   |
|--|---|--|--|
|  | CAMBRIDGE, MASSACHUSETTS  | - 1  | 18.0 BY 23.0 DEG LIMB-TO-LIMB (9700 NM) FROM GEO-SYNCH ALT   |
| 1. THEE  | 2 2 2   | 2 ACRONYM 3. EXP NO                                  | 40,ANGULAR RESOLUTION41, SYATTAL RESOLUTION  |
| (TITLE CONT.)  | JER   | A. PESUME 5. VLASION                                 | 12. POINTING ACCURACY 43 POINTING RATE 44, ALTITUDE 45, INCLINATION  |
|  |   | 10/69  | MED ECCENTRIC ME   |
|  |   | 8. TELEPHONE   | 46. SPECIAL REQUIREMENTS   |
| B. CO-INVESTIGATOR   | 10. ORGANIZATION  | 301-982-4094   | 47. COMPONENTS   |
|  |   |  | ) ANTENNAS   |
| 12. CONTRACT 13. CONTRACT NUMBER   | 14. FLASH INDEX NUMBER 19. DATE   | 16.couperio 17. STATUS                               | AVERAGE POWER 61. STANDBY POWER 52. PEAK POWER 53. P   |
| BOTINOM  | C BOLES A MOR OF CO.  | 23 TEL COLONE  | 43 FF IN MAGNETIC IS NUCLEAR IS THERMAL IS SHIFTONG  |
| BURKE, J. R.   | DOTRS OSSA/SCS  | 202-962-0581   |  |
| 22 VENDOR  | 2   | 24. FLIGHT 25.LEAD TIME                              | 60. DATA   |
| HUGHES AIRCRAPT CO   | EL SEGUNDO, CALIPORNIA  | 08/68 NA   | NA REALTIME TELEMETRY CONTINUOUS   |
| BOARD BOARD CO.  | Q#7 685   | Stephin Stephin                                      | 02. TELEMETHY REQUIREMENTS   |
| 28. APPLICATION  | (A ECETYE) 4-6AL (INA NOBLI) ONF  |  | The state of the s |
| COMM   | ATS 4   |  |  |
| 30. PURPOSE  |   |  | 43 ADVANTAGES AND LIMITATIONS  |
| PRIMARY-TO DETERMIN  |   | A WIDEBAND TRANS-                                    | SECOND STAGE PAILURE ON ATS 4 PREVENTED SPACECRAPT FROM REACHING   |
| MISSION REDICES  | CURONG MEDIUM, ESPECIALLY TO EVALUATE THE TRA   | THE TRANSMISSION OF MONO-                            | SYNCHRONOUS ORBIT.   |
| OF MANY VOICE TPLE   | CHRONE AND COLOUR PERFECTION AND THE STRUCKINGOUS INDICATION OF MANY VOICE, TRIPETADE AND DATA CHANNELS PROM SPURGAT DROUND   | CELECTRICATE CO                                      | 1) NACA DEPOS XTT ATC D RETEACE NO 68-127 THEY 21 1968 +++2)   |
| STATIONS, *** SECONDA  | STATIONS, *** SECONDARY - TO DETERMINE AND EVALUAT  | EVALUATE THE PHENOMENA                               | TIS D' RELEGATIONS TECHNOLOGY SATELLITE  |
| APPECTING WIDEBAND SHP TRANSMISSIONS.  | SHF TRANSMISSIONS.  |  | GREENBELT, MD. ***3) TECHNICAL DATA REPORT FOR THE ATS PROGRAM,  |
| 31. PRINCIPLES OF OPERATION  | - :   |  | :SEC. 7, GSFC, 1968.   |
| THE SYSTEM CONSISTS  | <b>~</b> (  | ANTENNASONE TO RECEIVE                               |  |
| 1: 650 CH7AND THO  | AT EITHER 6.212 OR 6.301 GHZ AND ONE TO TRANSE.   | CONE TO TRANSMIT AT 4.120 OR                         | AN HICTORICAL DEMANAS  |
| THE STATE OF THE PARTY OF THE P | THRESTONDERS EACH CONTRINENTS   | CHIRITIAN INC INVENTING                              | CIMITAD CVCTPMC ON APC 1 2 AND 3. INDUSTRAL ON APC 5   |
| LEL. THE 4.120 GHZ   | INS TH  | TWT'S, AND THE                                       | TO THE TOWN SO THE PRINCIPLE OF BANK   |
| ZH5 (  | SYSTEM CONTAINS TWO 12.5 W TWT'S. E   | EACH ANTENNA HAS A                                   | Transparent report of the late |
| HALF-BEAMWIDTH OF 2  | Ď.  | 16.5 DB. USING THE 8 W                               |  |
| TRANSMITTER AND INCLUDING LOSSES, THE  | щ   | E RADIATED POWER                                     |  |
| IS 23.7 DBW (234 W)  | IS 23.7 DBW (234 W). THE TRANSPONDERS CAN BE  | CAN BE USED IN EITHER OF                             |  |
| THO BODES: A BULLIFFE TO THE TOTAL MODE  | ACCESS (MA) ACD   | E OK A SIGPLE FREQUENCT<br>FH OF A S MAY THE MA MODE |  |
| SIMULTANEOUSLY RELA  | -   | STATIONS, UP TO                                      |  |
| 1200 3.1 KHZ WIDE V  | $\mathbf{z}$  | YPE CHANNELS USING SSB                               | -  |
| ON THE UPLINK AND P  | _   | ON THE DOWNLINK. THE FT                              |  |
| SODE, USING FM/FM S  | SOUR, USING PM/FM SIGNALS, HAS A BANDWIDTH OF   | 25 MHZ AND IS USED                                   | -  |
| BROADCASTS. THIS NODE CAN ALSO   | S C   | NORS OR COLOR TELEVISION<br>D IN A SECOND PREDUENCY  |  |
| DIVISION MULTIPLEXI  | HANDLE  | 1200 CHANNELS OF                                     |  |
| VOICE OR DATA. THE   | Ė.  | THE GROUND.  |  |
| OF NIDIRECTIONAL ANTERNA IS USED WALLE 32. PHENOMENA DESERVED  | TENNA IS USED WALLE SALES   | 3.   |  |
| TRANSMISSIONS PROM   | TRANSMISSIONS PROM ATS GROUND STATIONS AT 6 GHZ   | 2  |  |
| 33. MEASURENERT BARGE  |   |  |  |
| 3000   | remaining ages of the co South excepted days of a defection on the additional management of the contract of |  |  |
| of Phecision and accorde   |   |  |  |
|  |   |  |  |

| ATIONAL  ATCROWAVE TRANSPONDER  (TITLE CONT.)  S. PRINCIPAL INVESTIGATOR  DARCEY R. J.  D. CO-INVESTIGATOR  12. CONTRACT NUMBER  13. MONITOR  18. MONITOR  18. MANTOR  19. MAR | AGENCY AND SPACE ADMINISTRATION CAMBRIDGE, MASSACHUSETTS CAMBRIDGE, MASSACHUSETTS CAMBRIDGE, MASSACHUSETTS CAGANIZATION CA | 2. ACRONYM 3. EXP NO HTRAN 4. RETURE 1.1/10/69 0005 301-982-4094 | 6 212 AND 38. FIELD OF VIEW 18 0 BY 2 40. ANGULAR RESOLUTION 411. |
|--|--|--|---|
| 1 101 1 1 1 1 1 1 1  | ORGANIZATION ORGANIZATION ORGANIZATION ORGANIZATION  (A. FLASH INDEX NUMBER IS. SATE)  | 6 6  | 40, ANGULAR RESOLUTION 41.  |
| ONDER T NUMBE  | ORGANIZATION  DUDARD SPACE FLIGHT CTR 3  ORGANIZATION  (A. FLASH INDEX NUMBER IS START  AGENCY  ASA HDOTRS  OSSA/SCS 2  ASA HDOTRS  OSSA/SCS 2   | 6  |   |
| T NUMBER   | ORGANIZATION ORGANIZATION ORGANIZATION ORGANIZATION  (A. FLASH INDEX NUMBER IS. BATE AGENCY TO PORGANIZATION | 6  |   |
| NOW  | ORGANIZATION  ORGANIZATION  ORGANIZATION  (A. FLASH INDEX NUMBER 15. BATE  ASA BDOTRS  OSSA/SCS 2  | 6  | 42, POINTING ACCURACY 43. PC                                      |
| T NUMB   | ASA HUDORS OSSA/SCS 2  | ерноме<br>-982-4094  |   |
| R.J. IIGATOR  13. CONTRACT NUMBE   | ODDARD SPACE FLIGHT CT8 3 ORGANIZATION  14. FLASH INDEX NUMBER 15. GAYE AGENCY  12. LOCATION  22. LOCATION  DDDARD  13. LOCATION   | -982-4094  | 46, SPECIAL REQUIREMEN  |
| 13. CONTRACT NUMBE   | 14. FLASH INDEX NUMBER 15. SATE TO THE START | Livoria  | OF CONCOUNTS.   |
| 13. CONTRACT NUMBE   | I.4. FLASH INDEX NUMBER ITS DATE AGENCY TO POM OFFICE TO TO LOSAL SEC STATE TO LOSAL SEC  | a von  | TRANSPONDER. T  |
| 1. B.  | NCY 30.PGM OFFICE 21  BDOTRS 0.55A/SCS 2   | 16.COMPLETION 17. STATUS   | 48. WEIGHT 49 VOLUE   |
| J. R.  | HDOTES OSSA/SCS  | 03/69 OPERATIONAL  | A21 - 45  |
|  | B LOCATION   | OCO OFO  | OF INTERFERENCE INTER   |
| 1  |  | 24 FLIGHT 25. LEAD TIME  | 59. CALIÉRATION   |
| HUGHES AIRCRAFT CO   | EL SEGUNDO, CALIFORNIA O   |  | NA  |
| TO ANY DOWN OF A CUT OF TO TO  | ans things each thought  | SECURITY   | N. IELEMEIA' HEUDING  |
| 2110   |  |  | e<br>5  |
| COBR   | ATS 5  |  |   |
| 30. PURPOSE  |  |  | 63. ADVANTAGES AND LIN  |
| PRIMARY-TO DETERMINE TH  | PRIMARY-TO DETERMINE THE USEFULNESS OF SHP AS A WIDEBAND TRANS-  | IDEBAND TRANS-   |   |
| HISSION. HEDIUM, ESPECTA   | ALLY TO EVALUATE THE TRANSMI   | ESSION OF MONO-  | 200   |
| CHRUBE AND COLOR TELEVI  | CHROME AND COLOR TELEVISION AND THE SIMULTANEOUS TRANSMISSION  | FRANSALSS LON  | A MACA DODGO A  |
| STATIONS, ***SECONDARY-TO DET  | OF GANY VOICE, TELETIFE AND DATA CHANNELS FROM SEVERAL GROUND<br>STATIONS.***SECONDARY-TO DETERMINE AND EVALUATE THE PHENOMENA   | VERAL GROUND   | PROJECT DEVELO  |
| APPECTING WIDEBAND SHP TRANSMISSIONS.  | TRANSMISSIONS.   |  | GSPC, GREENBEL  |
| 31. PRINCIPLES OF OPERATION  |  |  | PROGRAM, SEC.   |
| THE SYSTEM CONSISTS OF   | THE SYSTEM CONSISTS OF TWO PLANAR ARRAY ANTENNASONE TO RECEIVE   | -ONE TO RECEIVE  |   |
| AT EITHER 6.212 OR 6.30  | AT EITHER 6.212 OR 6.301 GHZ AND ONE TO TRANSMIT AT 4.120 OR   | AT 4.120 OR  | 0 - 40.00   |
| 1.550 GHZAND TWO TRAN  | NSPONDERS EACH CONTAINING TO   | HO TRAVELING   | 95, HISTORICAL REMARK   |
| TRI THE U. 120 CHZ SWS   | WANT TUBE (THE DEPOST FIRST THAT CAN OFFICATE SINGLE OR IN PARALTET. THE DESCRIPTION THE CAN THE DESCRIPTION THE CAN THE   | AND THE  | 69. DIAGRAMS  |
| 1.550 GHS SVAPPA CONTAIN   | TNS TWO 12.5 B TWT S. PACH   | ANTENNA HAS A  |   |
| HALP-BEARWIDTH OF 23 DE  | HALP-BEARTIDTH OF 23 DEG AND A GAIN OF 16.5 DB. USING THE 8 W  | USING THE 8 W  |   |
| TRANSHITTER AND INCLUDI  | ING LOSSES, THE EPPECTIVE RA   | ADIATED POWER  |   |
| IS 23.7 DBW (234 W). T   | THE TRANSPONDERS CAN BE USEL   | D IN EITHER OF   |   |
| TWO MODES: A MULTIPLE  | A MULTIPLE ACCESS (MA) MODE OR A SIMPLE PREQUENCY  | LE PREQUENCY   |   |
| TRANSLATION (PT) HODE.   | TRANSLATION (PT) HODE. WITH A BANDHIDTH OF 4.5 MHZ, THE MA M   | HZ, THE MA MODE  |   |
| SIRULTANEOUSLY RELAYS,   | BRIMERN SEVERAL GROUND STAT  | TIONS, UP TO   |   |
| SOTO SULT SUL SUC OCCIO  |  | OCTURE DE  |   |
| MODE, DSING PRIVE STGNALS, HAS A BANDWIDTH   | ALS. HAS A BANDWIDTH OF 25 M   | -  |   |
| PRIMARILY TO EVALUATE RELAYS OF MONOCHROME   | OR   | OR COLOR TELEVISION  | ~ ~ .   |
| BROADCASTS. THIS MODE  | BROADCASTS. THIS MODE CAN ALSO BE USED IN A SECOND PREQUENCY   | ND PREQUENCY   |   |
| DIVISION MULTIPLEXING S  | SYSTEM TO HANDLE UP TO 1200  | CHANNELS OF  |   |
| VOICE OR DATA. THE HOD   | THE MODE USED IS SELECTED PROM THE   | PROM THE GROUND. AN  |   |
| OMNIDIRECTIONAL ANTENNA  | OMNIDIRECTIONAL ANTENNA IS USED WHILE S/C SPINS.   |  |   |
| OH ATS   | GROUND STATIONS AT 6 GHZ   |  |   |
| 33. MEASUREMENT RANGE  | 97   |  |   |
| >0 × 01100 × 010 × 010 010 010 010 010 01  |  |  |   |
| 34. PRECISION AND ACCORACY   |  |  |   |
|  |  |  |   |

|        | 3.36.  |
|--------|--|
| ****** | 25. MHZ  |
| O Z    | 18.0 BY 23.0 DEG LIMB-TO-LIMB 9700 NM PROM GEO-SYNCH ALT ADARGED AN RESOLUTION AT SPATIAL RESOLUTION   |
| 19107  | ! 그  |
| 0.5    | 46. SPECIAL REQUATORIAL POSIGRADE  |
|        | 47. COMPONENTS   |
|        | TRANSPONDER, TWO ANTENNAS  18. WEIGHT '19 VOLUME 18. WEIGHT '19 VO |
| AL     | 20 WATTS.  |
| _      | SOUTH CAPA   |
|        | ALIBRATION 60 DATA RECOVERY  |
|        | NA RELEMETRY REQUIREMENTS REALTIME TELEMETRY CONTINUOUS  |
| NC.    | NA   |
| -[-    |  |
|        | 63. ADVANTAGES AND LIMITATIONS   |
| 1      |  |
| ۲_     | RA DEEEDBANES  |
|        | 0 301 10 VIII TC1-03 ON GORGICO G-200 mtv 2200 Mask  |
|        | RISTU, RELEASE NO. 00-12/, JULI 21, 1909; BNT PLAN-APPLICATIONS TECHNOLOGY SATELLITE,  |
| 7      | **3% TECHNICAL DATA REPORT   |
| G A    | PROGRAM, SEC. 7, GSPC, 1968.   |
| 1      |  |
|        |  |
| 1      | SIMILAR SYSTEMS ON ATS 1, 2 AND 3; IDENTICAL ON ATS 4  |
|        |  |
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|    |  | NOTO I MENT DECIME                                   |                           | 35. SPECTRAL RANGE             |
|----|--|--|---------------------------|--------------------------------|
|    | NATIONAL AERONAUT  | ICS AND SPACE ADMINISTRATION                         |                           | 0.475 TO                       |
|    | ELECTRON   | ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS |                           | 38. FIELD OF VIEW              |
|    |  |  | 2. ACRONYM 3. EXP NO      | 40.ANGULAR RESOLUTION 41. SP.  |
|    | EAR VIDICON CAMERA   | SYSTER   | 4                         |                                |
|    | (TITLE CONT.)  |  | 4. RESUME 5. VERSION DATE | 42. POINTING ACCURACY 43. POLI |
|    | NOITACINAGOO, 1  | III  | 5000 69/01/11             | STANDANGO OF CALCULATIONS OF   |
|    | ٤  | DIM CONNED   | 301-002-4100              | 40. STECIAL RECOIDENENTS       |
|    | 980  | ירה דנו כניונה                                       | HONE                      | 47. COMPONENTS                 |
|    | -  | CE PLT CENTER  | 301-982-2493              | 3 RBV CAMPRAS (C               |
|    | ONTRACT NUMBE  | H 14. FLASH INDEX NUMBER 15. START 16 COUNTE         | 16.COMPLETION 17. STATUS  |                                |
|    | CPIP HASS-11621  |  | ADVAN DSGN                | m                              |
|    | TOR  | 20. PGM OFFICE 21. TELEPHONE                         | HONE                      | N 38 A                         |
|    | T.   | OSSA/SRB   | 63-5039                   | . S                            |
|    | 22. VENDOR 23 LOCATION   |  | JATE 26. LEAD TIME        | SO. CALIBRATION                |
|    | RCA ASTRO-ELECTRONICS PRIN   | PRINCETON, N.J.                                      | 01/72                     | NO IN-FLIGHT CAL               |
|    | 26. INSTRUMENT TYPE  |  | 27.<br>SECURITY           | 62, TELEMETRY REQUIREMS        |
|    | IMAGER, 2-INCH HIGH-RESOLUTION RETURN-BEAM-VIDICON   | N RETURN-BRAM-VIDICON                                | UNC                       | 1 MINUTE PER ORE               |
|    | 28. APPLICATION  | 29. SPACECRAFT                                       |                           |                                |
|    | ERSP, MET  | BRTS   |                           |                                |
|    | 30. PURPOSE  |  |                           | 63. ADVANTAGES AND LIMIT       |
|    | PRIMARY-TO PROVIDE CONTINUOUS,   | , OVERLAPPING MULTI-SPECTRAL                         |                           | HIGH RESOLUTION                |
|    | GRAPHIC COVERAGE OF THE EARTH'S SURFACE ALONG THE ORBITAL  | S SURFACE ALONG THE C                                | RBITAL TRACK              | TIONAL CAPABILIT               |
|    | EPEATED O  | ANY GIVEN AREA WITHIN                                | THE MINIMUM               | 64. REFERENCES                 |
| •  | TIRE INTERVAL POSSIBLE.  |  |                           | 1) KCA ASTRO-ELE               |
| 28 |  |  |                           |                                |
|    | 31. PRINCIPLES OF OPERATION  |  |                           |                                |
|    | THE RBVC, AS PROPOSED, IS A 3  | CAMBRA SYSTEM SPANNING                               | G THE VISIBLE             |                                |
|    | SPECTRUM IN 3 BANDS; 475-57  | 5, .580680, AND .690                                 | 830 MICRON.               |                                |
|    | SPECTRAL BANDS ARE OBTAINED THROUGH USE OF FILTERS IN ACQ  | HROUGH USE OF FILTERS                                | PILTERS IN ACQUISI-       | 65, HISTORICAL REMARKS         |
|    | TION OPTICS. AN ELECTRONICALLY TRIGGERED,  | Y TRIGGERED, VARIABLE-                               | VARIABLE-SPEED, POCAL-    |                                |
|    | PLANE SHUTTER ALLOWS PICTURE-TAKING OVER A WIDE RANGE OF   | TAKING OVER A WIDE RAN                               | GE OF SCENE               | 69. DIAGRAMS                   |
|    | BRIGHTNESS AND PROVIDES UNIFORM EXPOSURE OF THE VIDICON. THIS  | RM EXPOSURE OF THE VID                               | ICON, THIS                |                                |
|    | SENSOB. A 2-INCH RETURN BEAM VIDICON. COMBINES THE VIDICON   | VIDICON, COMBINES THE                                | VIDICON AND               |                                |
|    | ORTHICON TUBE, THE VIDEO OUTP  | IT IS DERIVED PROM THE                               | RETURN SCAN-              |                                |
|    | NING REAM A PROTOCONDUCTIVE  | SHRPACE CHARGES THE TA                               | RGET SHRPACE              |                                |
|    | THE CONTROL OF THE LITTLE BECTANNING THE PROPERTY OF THE PROPE | CRIVED, THEN AS THE EI                               | IN TO NORFOR              |                                |
|    | ACCEP THE CANCERDED MAN CANCEL MA | THE CHARGE MODILATI                                  | ATHIC BEAM                |                                |
|    | WHICH IS THEN AMPLIFIED BY AN ELECTRON MULTIPLIER. THE VIDEO   | ELECTRON MULTIPLIER.                                 | THE VIDEO                 |                                |
|    | OUTPUT OF THE SYSTEM MAY BE P  | BE PED DIRECTLY TO THE MODULATOR OF                  | ULATOR OF THE             |                                |
|    | SPACECRAPT COMMUNICATION SYST  | EM. THE CAMERAS ARE PO                               | INTED AT                  | ·                              |
|    | NADIR AND A NEW SCENE IS INAGED ON THE PHOTO CONDUCTOR SURFACES  | ED ON THE PHOTO CONDUC                               | TOR SURFACES              |                                |
|    | EVERY 25 SEC. THE RESOLUTION CAPABILITY  | CAPABILITY OF THE SYSTEM IS                          | EM IS 4500 TV             |                                |
|    | LINES, EOUTPPED SITH A 130 MM  | PL. F/2.8 LENS. EACH                                 |                           | ****                           |
|    | COVER AN AREA OF 100 X 100 MM AT A RESOLUTION OF ABOUT 1   | AT A RESOLUTION OF AB                                |                           | ***                            |
|    | PER TY LINE FROM 496 MM ALTITUDE.  | UDE. THE SENSOR IS CAP                               | P                         |                                |
|    |  |  |                           |                                |
|    | 32. PHENOMENA OBSERVED   |  |                           |                                |
|    | RADIATION PROM THE SURPACE OF THE EARTH IN   | THE EARTH IN THE VISIBLE                             | BLE SPECTRUM              |                                |
|    | 33. MEASUREMENT RANGE  |  |                           |                                |
|    | DYNAMIC RANGE= 100 AT 0.1 MICROWATT-SEC/SQ-CM; 13  |  | GRAY LEVELS               |                                |
|    | 34. PRECISION AND ACCURACY   |  |                           |                                |
|    | SIN= 35 DB AT 0.1 MICROWATT-SEC/SQ-CM W/O APERTURE CORRECTION  | EC/SQ-CM W/O APERTURE                                | CORRECTION                |                                |

|           | 36. SPECTRAL RESOLUTION 37, TIME CONSTANT  |
|-----------|--|
|           | 1  |
|           | VIEW 39. GROUND SWATH  |
| 2         | 11.5 BY 11.5 DEG 100 NM BY 100 NM FROM 500 NM ALTITUDE   |
| 2         | O. OO. DRE 100 PRRT DER TV-IINE FROM SOO NM AITTINE  |
| VERSION   | ACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION   |
| 005       | MED CIRCULAR SUN-SYNCH RETROGRADE  |
| T         | 40. SPECUAL REMENTS  |
| Γ         | 47. COMPONENTS   |
|           | RBV CAMERAS (CAMERA HEAD + ELECTRONICS), RECORDER, TR  |
| 2         | 120 GA WING CC UAMES 1.5. NEAK POWER 53. MT  |
| 2         | 19   |
|           | MAGNE  |
| ŠĒ        | 60. DATA RECOVERY 61 FRI   |
| Ţ         | NO IN-FLIGHT CALIBRATION DELAYED TELEMETRY ON COMMAND  |
| UNC       | 1 MINUTE PER ORBIT BASED ON AVERAGE OF 14 ORBITS PER DAY   |
|           |  |
| -         | 63. ADVANTACES AND LIMITATIONS   |
| TO-       | HIGH RESOLUTION MULTI-SPECTRAL PHOTOGRAPHY WITH 1 YEAR OPERA-  |
| . CK      | TIONAL CAPABILITY  |
| <br>E;    | 0204 0840444 *****************************   |
|           | KCA ASIKU-ELECIKUNICS DIV. IECHNICAL   |
|           |  |
| BLE       |  |
| ON.       | 25 LICTORY COLUMN COLUM |
|           | 65. HSTORICAL REMARKS  |
| 1 21      | 69, DIAGRAMS   |
|           |  |
| N.        |  |
| CE        |  |
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| IN STRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESERACH CENTER CAMBRIOGE, MASSACHUSETTS      | 36. SPECTRAL RANGE  0.4 TO 0.65 MICRON NA 38. FIELD OF VIEW  39. FIELD OF VIEW  39. FIELD OF VIEW  39. FIELD OF OF TO OF |
|--|--|
| 1. TITLE 2. ACRONYM 3. EXPINO  | TION 41. SPATIA  |
| VIDICON CAMERA SYSTEM  | 2.2 DEG 1.4 NN PER TV LINE FROM 400 NN ALTITUDE AS POINTING ACTION AS INCLINATION  |
| DATE 11/10/69  | 2  |
| STIGATOR 7. ORGANIZATION 8. TELEP  |  |
| O BRIER, J. J. (T. MON) GODDARD SPACE PLT CENTER 301-982-5716 9, CO-INVESTIGATOR   | 47. COMPONENTS   |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATE 16. CONTRACT NUMBER 15. STATUS                           | BY POWER 52. PE  |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 56. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 58. SHIELDING   |
| GLOVER, J. C. NESC (ESSA) 301-440-7543   | 58. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OSSERVATION   |
| TRO-ELECTRONICS PRINCETON, N. J.   | HIT CALIBRATION DELAYED TELEMETRY EQUIPMENTS   |
| 5-INCH WIDE-ANGLE P/1.5 LOW-RESOLUTION VIDICON   | PULL REEL OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING<br>AN PH TRANSHITTER OPERATING AT A PRECUENCY OF 235 MHZ.  |
| MET BSSA 1   |  |
| -TO ACQUIRE AND TRANSMIT PICTURE   | BROAD STNOPTIC VIEWING OF CLOUD COVER PATTERNS, HORE VALUABLE  |
| COVER TO PROVIDE DEFENDATION WITH DETAILED INFORMATION ON INDIVIDUAL CLOUD TYPES OVER SPECIFIC AREAS. THE PIRST SATELLITE  | UALA TUR MEALIBER ANALISIS INAN ERUF FEUT DE MARKUM ANGLE LAGGERS.   |
| IN THE TIROS OPERATIONAL SATELLITE (TOS) SYSTEM.   | 1) SIGNIFICANT ACHIEVEMENTS IN SAT MET 1958-1964, NASA SP-96,***   |
| 31. PRINCIPLES OF OPERATION  | NAUTICS, V.5, JUNE 1960. ***3) MESNER, M.H. AND STANISZENSKI, J.:  |
| HER BOTH A CHANG AUGIN MY CAMBON CAS TONGTON OF THE STORY  | IN CRIENTS FOR SEATE PERSONS ASSESSED AS A SEAT OF SEATE ASSESSED AND CONTRACT THAT AND CONTRACT OF SEATE ASSESSED.  |
| HIS PLIGHT   | 1) INSTRUMENTS AND SEACCEMENT: MASA SE SOCO, 1990. AVAILABLE FROM NATIONAL WEATHER RECORDS CTR (ESSA) ASHEVILLE, NC. 65. HISTORICAL REMARKS  |
| ρ.   |  |
|  | 86. OlAGRAMS   |
| IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PICTURE TAKING HOUE  |  |
| (10 RPH). BACH CAMERA CONSISTS OF A 1/2-IN VIDICON TUBE AND A  |  |
| POCAL-PLANE SHUTTER THAT PERMITS STORAGE OF STILL PICTURES ON  |  |
| THE TUBE SCREEN. AN ELECTRON BEAM CONVERTS THE STORED PICTURES IND THE TUBE PURCHES AND                                    |  |
| -  |  |
| THE CAMERA HAS A WIDE ANGLE (105 DEG) ELGEET F/1.5 LENS. THE   |  |
| OP 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED FOR STORAGE IN 2  | -  |
| N PCI  |  |
| THE TARGET INAGE TO BE ELECTRICALLY ERASED. TRANSMISSION OF THE REPRODE 32 DICTIBRE CAN BE ACCOMPLISHED IN 100 SEC BY A 2- |  |
| UENCY OF 235 MHZ.  |  |
| 32. PHENOMENA OBSERVED   |  |
| CLOUD COYER AND THE BARTH'S SURPACE  |  |
| C TRUDIC OB CONV   |  |
| 3. PRECISION AND ACCURACY  |  |
|  |  |

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| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONUS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS              | 35. SPE        |
|--|----------------|
| AUTOMATIC PICTURE-TRANSMISSION SYSTEM APT  | 40. ANGL       |
| 11/  | 42 POIN        |
| 19   | 46. SPE        |
| STAT   | 2 V 3          |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 54. INTE       |
| 22 VENDOR 124 FLIGHT 184 ELEAD TIME  | SEN S          |
| TRO-ELECTRONICS PRINCETON, NEW JERSEY 02/66  | 62 18          |
| CH AUTONATIC-PICTURE-TRANSHISSION VIDICON 28. SPACECRAFT   | THE            |
|  | 4000           |
| -TO PROVIDE METEOROLOGISTS WITH REALTIME INFORM  | DIRE           |
| CLOUD AND WEATHER CONDITIONS OWER A LARGE AREA AROUND THE RECEIVING STATION***SECONDARY-MAINTAIN CAPABILITY OF THE TOS-          | STOF<br>64 REF |
| ESSA SATELLITE SYSTEM.   | 1) A E         |
| 3). PRINCIPLES OF OPERATION  | TOS            |
| AT CONSISTING OF 2-IDENTICAL 1-INCH VIDICON A  | NAS            |
| PLOWN ON ESSA 4 AND 6. EACH CAMERA UTILI   | 65. HIS        |
| GEA-KINOPTIC, 108-DEGREE, WIDE ANGLE, F/1.8 OBJECTIVE LENS WITH A POCAL LENGTH OF 5.7 MM. THE TWO CAMERAS ARE MOUNTED 180 DE-    | SI #1          |
| ART ON THE SIDE OF THE SPACECRAFT AND PERPENDICULA   |                |
| DURING WHILE FOIL BURELL! DORGRAND ONCE EVEN!  |                |
| MRED TO TAKE AND TRANSALT A PICTURE EVERY 350 SEQUENCE OF 8 PICTURES, WHILE THE SATELLITE IS                                     |                |
| THE ACTUAL PICTURE TAKING REQUIRES 8 SECS AND THE TRANSMISSION 200 SECS. DURING THIS LATTER PERIOD THE VIDICON IS SCANNED AT     |                |
| NES PER SECOND, AND THE SIGNALS TRANSMITT  |                |
| EC AND A VI  |                |
| SCAN, FOCAL-PLANE SHUTTER ADJUSTED FOR A 1.5-MSEC EXPOSURE. TWO 5-WATT TV TRANSMITTERS ARE USED. EACH PROVIDING A 137.5 MHZ CAR- | ******         |
| APT GROUND STATION WITH AN APPROPRIATE ANTENNA, RE-  |                |
| a u e u  |                |
| CLOUD AND TERRAIN PEATURES OF APPROX 2 NM OR LARGER  |                |
| 33. MEASUREMENT HANGE DYNAMIC PICTURE BANGE OF 25:1  |                |
| ACY.   |                |
| S/N OF 30 DB AT U. / FOUT CANDLES/SEC; 10 LEVELS OF GRAY   |                |

|   | 0 0 65<br>39 0 0 0 18<br>41. SPATIAL RESOLUTI  |
|---|--|
|   | NH BY 1800 NM PROM 750 NM  |
|   | NA BY 1800 NA FROM 750 NA  |
|   |  |
| 2   | 0.132 DEG 1.7 NM FROM 750 NM ALTITUDE  |
| 52 54 56 56 56 56 56 56 56 56 56 56 56 56 56  | . POINTING RATE  |
| 2   | SECONDER SON-SINCH RETROGRADE  |
| 59. C.  | ירבייאר הבעטת השונית יס  |
| 59. C.  | COMPONENTS   |
| SELECT THE | VIDICON CAMERAS, 2 ELECTRONICS MODULES, 2 FM TRANSMITTERS WEIGHT 48 VOLUME SO AVERAGE POWER SISTANDS POWER ST WITE |
| 59. S   | B 28 WATTS 40 HATTS  |
| S   | 55 INTERFERENCE 56 INTERFERENCE 57 INTERFERENCE  |
| 2 E 2 C C 2   | SENSITIVE  |
| S 4 8 4 5   | CALIBRATION  OD DAT THE DEPT DEPT OF CONTRICT DAYS TRO   |
|   |  |
| H H H C C C C C C C C C C C C C C C C C   | I, TURN-ON, AND PHASING CODE DRIVE A MOD   |
| ST  | WHICH AMPLITUDE MODULATES THE 2400 HZ SUBCARRIER, THUS REQUIRING<br>4000 HZ MAXIMUM PREGUENCY CAPABILITY.          |
| SI  | 'ATIONS  |
| 2 2   | DIRECT TRANSMISSION TO MANY GROUND STATIONS WITHOUT INTERNEDIATE   |
|   |  |
| =   | WEATHER SAT CTR, 1965.***2)  |
| œ. :  | PT TV CAMERA SYSTEM FOR MET  |
| A C   | NASA/GSFC IN D-1915, NOV. 1963.***3) FINAL ENGINEERING REPORT,   |
| NA  | AND WEINSTEIN, O.: REVIEW OF A   |
|   | CAMERA SYSTEMS DEVELOPMENT FOR MET. GSPC,  |
| 1 E   | 65. HISTORICAL REMARKS   |
|   | Truck of Binbus 1 han 2, and Essa 4 han  |
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| INSTRUMENT RESUME  | 36. SPECTRAL RESOLUTION 37. TIME CONSTANT O IN TO O A C MITCHON IN IN THE CONSTANT                       |
|--|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER   | 18. FIELD OF VIEW 38. GROUND SWATH   |
| CAMBRIDGE, MASSACHUSETTS   | 89.0 BY 89.0 DEG 1700 MM BY 1700 NM PROM 750 NM ALTITUDE   |
|  |  |
| ADVANCED VIDICON CAMERA SYSTEM (TITLE CONT.)   | 0.11 DEG 1.4 NN PER TV-LINE AT THE NADIR PROM 750 NM ALT APPOINTMENDATION AS ALTITUDE 42. INCLINATION    |
| 11/10/69   | MED CIRCULAR SU  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL REQUIREMENTS   |
| מפוופט   | 47. COMPONENTS   |
| CONTRACT IS ACCUMENTATION IN ELABOR WILLIAMS HESTARY INCOMETION CONTRACTOR   | 2 TV CANBRA SYSTEMS, 2 TAPE RECORDERS, SYSTEM ELECTRONICS  |
| G. CONTRACT NOMBER   | 43 LB  |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE   | 54. INTERFERENCE 55. INTERFERENCE 50. INTERFERENCE 57. INTERFERENCE 18. SHIELDING                        |
| GLOVER, J.C. NESC (RSSA) by Filest SSI FEAD TIME   | SENSITIVE 60. DATA RECOVERY IN FRECUENCY OF DESCRIPTION  |
| FRO-ELECTRONICS PRINCETON, N.J. 10/66 NA   | NAY-SCALE CALIBRATION DELAYED TELEMETRY  |
|  |  |
| INAGER, 1-INCH WIDE-ANGLE HIGH-RESOLUTION VIDICON  28. APPLICATION   | CRAPT 235-MHZ TRANSMITTER, TRANSMISSION TIME FOR A FULL ORBIT  |
| HRT, ERSP  | KIMATELY 3 MINUTES.  |
| TO THE REAL PROPERTY.  | ***************************************  |
| PRIMARITATO PROVIDE METEOROLOGICAL DATA IN THE FORM OF WIDE-ANGLE HIGH-RESOLUTION TRIRGISTON PICTORES OF RARTH'S CLOUD COVER. BY   | THE DISTORMENT HOUNTING FICTORES TAKE TAKEN STRATCHT BOWN MINISTER ING DISTORMEN AND INCREASING ACCHRACY |
| 0  | 64. REFERENCES   |
| ARY-HAINTAIN OPERATIONAL CAPABILITY OF THE AVCS.   | 1) FINAL ENGINEERING REPORT TOS A, VOL 1, 2, 3. RCA ASTRO-ELECTRONICS                                    |
|  | 1001TRACT NO. NAS 5-4034, BAY 5, 1967.***2) SIG ACHIEV IN SPACE  |
| 31. PRINCIPLES OF OPERATION  | OF SPACE CAMERA SYSTEMS DEVELOP. FOR METEOROLOGY. NASA/GSPC, AUG.  |
| THE AVCS, TEST PLOWN ON HINBUS 1 AND 2 AND OPERATIONALLY ON ESSA   | 1968. *** 4) DATA AVAILABLE FROM NATIONAL WEATHER RECORDS CTR  |
| 3 AND 5, ARE SIMILAR EXCEPT FOR DIPPERENT CAMERA LENSES AND ESSA   | (ESSA), ASHEVILLE, N.C.  |
| LINE RESOLUTION, THE   | SIMILAR TO AYCS ON NIMBUS 1 AND 2, AND ESSA 5.   |
| CARERAS ARE MOUNTED 180 DEGREES APART ON THE SIDE OF THE SPACE-  | 66. DIASRAMS   |
| CRAPT AND PERPENDICULAR TO THE SPIN AXIS. DURING PICTURE TAKING  |  |
| SEQUENCE THE CARREA LOUNS AT THE NAULA. THE LENS IS A TEGER AIN-<br>OPPIC 108 DEGREE WIDE ANGLE LENS WITH A POCAL LENGTH OF 5.7 MM   |  |
| AND AN ELECTROMAGNETICALLY CONTROLLED SHUTTER. THE CAMERA CON-   |  |
| PERTS THE OPTICAL IMAGE TO AN ELECTRICAL SIGNAL WHICH IS PRO-  |  |
|  |  |
| PRAME TIME. CONCURRENTLY WITH SHUTTER ACTUATION, A 16-INCRE-   |  |
| MENT GRAY SCALE IS INCLUDED AT THE EDGE OF EACH PICTURE FRAME AS<br>A CONTRAST CHRCK, THE CAMERA IS INDEPENDENTLY TRIGGERED INTO   |  |
| OPERATION ONLY WHEN IT COMES IN VIEW OF THE EARTH: THIS IS DONE  |  |
| BI A HORIZON CROSSING INDICATOR (RCI), ONE FOR EACH CAMERA. THE  |  |
| CABERA CAN TARE 6 OR 12 CLOUD COVER PICTURES PER ORBIT AT 260-   |  |
| A CONTRACTOR OF THE CONTRACTOR |  |
|  |  |
| CLUUD COVER OF EARTH (REFLECTED VISIBLE SOLAR KAUTALLON) 33. MEASUREMENT RANGE   |  |
| DINABIC BANGE OF 14 TO 11,400 FOOT-LANBERTS  |  |
| 34, PRECISION AND ACCURACY   |  |
| OUV IT LIAB RESCRIPTION LA LELS OF GRAF  |  |

| INSTRUMENT RESUME  | 0.3 TO 30.0 MICRONS  |
|--|--|
| NATIONAL ARRONAUTOS AND SPACE ADMINISTRATION ELECTRONICS RESERRANGENER.  | IEW 39. GROUND SWATH   |
| CAMBRIDGE, MASSACHUSETTS   | SEE ITEM 31 LIMB-TO-LIMB (4200 NM) FROM 750 NM ALTITUDE  |
| Z. ACHONYM   | 40.ANGULAR RESOLUTION 41, STATIAL RESOLUTION   |
| LOW-RESOLUTION INFRARED RADIONETER LA RESUME A PESUME A PESUME A PESUME A PESUME A PESUME A PESUME   | 42. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION   |
| 11/10/69   | MED CIRCULAR SU  |
| 8, TELEP   |  |
| OF WISCONSIN   |  |
| 8. CO-INVESTIGATOR 11. TELEPHONE   | COMPONENTS   |
| CONTRACT IN COMPACT MINISPED IN CLACK MINISPED IN START INCOMPLETONING CONTRICT  | AS WEIGHT TO VOLUME TO AVERAGE POWER IN STANDAY POWER IN  |
| CONTRACT NOMBER  |  |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING  |
| GLOVER, J.C. NESC/ESSA 301-440-7543  | SENSITIVE PPR THERMALLY ISOLATED   |
| 23 LOCATION  |  |
| P WISCONSIN MADISON, WISCONSIN 10/66   | DELAYED TRLEMETRY CONTINUOUS   |
| 28. NO HOMEN I THE SECURITY TO LUTETRIE TOUTDECOTHETON   | ON KRITC TADE CLOACTEV   |
| 29, SPACECRAFT   |  |
| EBT BOSA 3   |  |
| 30.PURPOSE .   | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY-TO GATHER DATA TO AID IN DETERMINING: (1) THE GEOGRAPHIC   | THE PPR DID NOT GET GOOD DATA STARTS HENCE TIME BRRORS OCCUR IN  |
| DISTRIBUTION OF ENERGY RADIATED PROFITE EARTH AND THE RELATION-  | MOST READOUTS.   |
| SOLE OF INTO EMERCI TO INCOMING ENERGY FROM THE SUN AND (2) THE DOCTOR OF THE SUN AND (2) THE  | 1) WINST BULLING DEBOOM A NOT THE CAST COUNTY TO THE CAST OF THE C |
| 10   | ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, MAY 5, 1957.***2)   |
|  | æ  |
| - 1  | NESC-42, PEB   |
|  | 3) ESSA NEWS RELEASE NO. RS 66-54, SEPT 19, 1968. ***4) DATA   |
| COMPONENTS: A FLAT PLATE RADIOGETER WITH A 180 DEG FOV, AND A  | AVAILABLE PROM NESC, ESSA, WASH, D.C.  |
| FLAT FLATE MADIORETER SOFTOILES A CONE SHIELD TO BINISIZE OR RE-   | OUT MISTORIAGE HEATT STON DIT ON THACE & D C SAN D   |
| SOUTH HERDY ON PACH SENSON TO A THIN ALIMINIA DICK THERMALLY AND   | THIS KAULUSKIEK WILL ALSO FLY ON LIUS A, B. C. AND U.  |
| THE HEADT OF THE STATE PROPERTY OF A STATE OF STATES IN THE STATES OF TH |  |
|  |  |
| JENGED DI 2 INDENIZIONE MOUNTED ON IND BECK JOHNACE OF THE DIENT. THE HOUSTNG TEMPERATHERS AND THE CONE TEMPERATHERS ARE SEPAR-  |  |
| - 4  |  |
| FOR THE DISKS BY THE USE OF ANODIZED ALUMINUM OR BLACK PAINT.  |  |
| THE BLACK PAINTED SURPACE WILL RESPOND TO THE SUM OF THE RE-   |  |
| PLECTED SOLAR, DIRECT SOLAR, AND RERADIATED LONG MAYE RADIATION.   |  |
| THE ANDIXED ALUMINUM SENSON DISKS MERLECT IN THE VISIBLE MANGE   |  |
| COURT OF THE BADIATED ENERGY THE THE PARTH BAT EXCLUSE TO A  |  |
|  |  |
|  |  |
| RTS ARE MOUNTED 180  |  |
| APART ON THE S/C BUT ISOLATED THERMALLY AND RADIATIVELY PROM IT.   |  |
| 32. PHENOMENA OBSERVED   |  |
| ENERGY RADIATED PROM AND REPLECTED BY THE EARTH/ATMOSPHERE   |  |
| 33. MEASUREMENT RANGE  |  |
| ADECINION AND A COULD AND  |  |
| 24. PHECISION AND ACCORDO  |  |
|  | Particular section of the section of |

| INSTRUMENT RESUME  NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | 35. SPECTRAL RANGE         36. SPECTRAL RESOLUTION         37. TIME CONSTANT           38. FIELD OF VIEW         39. GROUND SWATH         ALTITIOB           89.0         BY         89.0         DEG         1800         NM         BY         1800         NM         ALTITIOB  |
|--|--|
| 1, TITLE Z.ĀGRONYM 3. EXP.NO   | RESOLUTION 41. SPATIAL RESOLUTION  |
| AUTOMATIC PICTURE-TRANSMISSION SYSTEM 4 PREDING 6 PREDING 6 PREDING 1 PREDIN | 42. POWTHS ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION   |
|  | MED CIRCULAR SUN-SYNCH RETROGRADE  |
| O'BRIEN, J. J. (I. MON) GODDARD SPACE PLT CENTER 301-982-5716  | 46. SPECIAL REGUIREMENTS   |
| 9. CO.INVESTIGATOR 10. URGANIZATION 11. TELEPHONE  | 47. COMPONENTS 2. UINTCOM CAMBBAC 2 DISCRIBONITC MODIFIEDS 2 DM MIDIAUCHTEMBERS  |
| 12 CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STARF 16. COMMETION 17. STATUS  | 50. AVERAGE POWER 51. STANDBY POWER 52.  |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE   | 55 LB MAGNETIC SO. INTERFERENCE SO. INTE |
| GLOYRR, J.C. NESC/RSSA 301-440-7543  | SENSITIVE SENSITIVE   SENSITIV |
| IRO-ELECTRONICS PRINCETON, N.J. 01/67  | REALTIME TELEMETRY   |
| CH AUTOMATIC-PICTURE-TRANSMISSION VIDICON  | THE WIDBO OUTPUT, TURN-ON, AND PHASING CODE DRIVE A MODULATOR  |
| HET. BSSA 4.   | CAPABILITY.  |
| -TO PROVIDE METEOROLOGISTS WITH REALTIME INFORMATION WEATHER CONDITIONS OVER A LARGE AREA AROUND THE   | DIRECT TRANSMISSION TO MANY GROUND STATIONS WITHOUT INTERMEDIATE STORAGE ON MAGNETIC TAPE.   |
| RECELTING STRIFF SYSTEM.   | 1) APT USERS GUIDE, ESSA, NAT WEATHER SAT CTR, 1965.***2) STAMPPL,<br>R.A. AND STROID, W.G.: THE APT TV CAMERA SYSTEM FOR MET SATS.  |
| 3). PHINCIPLES OF OPERATION  | NASA/GSPC TN D-1915, NOV. 1963,***3) FINAL ENGINEERING REPORT,   |
| THIS SYSTEM CONSISTING OF THE IDENTICAL 1-INCH VIDICON APT CAM-  |  |
| NIMBUS 1 AND 2 AND   | OR MET. GS.  |
|  | SIMILAR TO APT ON TIROS 8, NIMBUS 1 AND 2, AND RSSA 2 AND 6.   |
| ARE MOUNTED 180 DEGREES  | 68. DIAGRAMS   |
| SPIN AXIS, SO THEY POINT DIRECTLY DOWNWARD ONCE BYERY 5.5 SECS,  |  |
| DURING WRICH TIME PICTURES ARE TAKEN. THE SYSTEM IS PROGRAMMED TO TAKE AND TRANSMIT A DICTURE RVERY 150 SECS FOR A TOTAL OF A  |  |
| PICTURES, WHILE THE SATELLITE IS IN DAYLIGHT, THE ACTUAL PIC-  |  |
| TOKE TAKING REPOILES & SECS AND THE TRANSMISSION 200 SECS. DUR-<br>ING THIS LATTER PERIOD THE VIDICON IS SCANNED AT FOUR LINES PER   |  |
| SECOND, AND THE SIGNALS TRANSMITTED PRODUCING AN 800-LINE PIC-   |  |
| -F, FULL-SCAN, FOCAL-E   |  |
|  |  |
| GROUND STATION WITH AN APPROPRIATE ANTENNA, RECEIVER, AND A RE-<br>CORDER CAN RECEIVE THESE PICTURES WHEN THE SPACECRAPT IS WITHIN   |  |
| ACOUISITION RANGE.   |  |
| CLOUD AND TERRAIN FEATURES OF APPROX 2 NM OR LARGER  |  |
| DAMAIT DICHIDG DAMOD 25.4  |  |
| 1 1  |  |
| S/N OF 30 DB AT 0.7 POOT-CANDLES/SEC: 10 LEVELS OF GRAY  |  |

| INSTRUMENT RESUME  | IANGE 38. SPECTRAL RESOLUTION 37. 1   |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBINOE, MASSACHUSETTS                                    | 38. FIELDOF VIEW 39. GROUNDSWATH 38. GROUNDSWATH AND STREET OF VIEW 50. O NEW 1700 NW NEW 700 NW NEW TOWNS                                |
| 2. ACBONYM 3. EXP NO   | BI 07.4 U DES I I UU NG BI I I NO NG FAUR<br>RESOLUTION41. SPATIAL RESOLUTION   |
| ADVANCED VIDICON CAMERA SYSTEM (TITLE CONT.)   | 0.11 DBG 1.4 NN PER TV-LINE AT CENTER PROM 750 NM ALTITUDE  |
| 11/10/69 0005  | NED CIRCULAR ST   |
| 7. ORGANIZATION 8. TELEPHONE   |   |
| O'BRIEN, J.J. (T.MON) GODDARD SPACE FLT CENTER 301-982-5716 9. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE                        | 47. COMPONENTS  |
| 12.COUTRACT   13. CONTRACT NUMBER   14. FLASH INDEX NUMBER   15.57.677   16.0046.01041. STATUS                                       | 2 TV CAMERA SYSTEMS, 2 TAPE RECORDERS, SYSTEM BLECTRONICS 48. WEIGHT AS VOLUME 50. AVERAGE POWER IS SANNOW POWER IS. PEAK POWER IS MITTER |
| POST FLIGHT  | 43 LB 16 WATES  |
|  | E 55. INTERFERENCE 50. INTERFERENCE 57. INTERFERENCE CONC.THITUD  |
| 23 LOCATION 24 FLIGHT 25. LEAD TIME  | 56, CALIBRATION 60. DATA RECOVERY 61. FREGUENCY OF OBSERVATION  |
| RCA ASTRO-ELECTRONICS PRINCETON, NEW JERSEY 04/67 NA   | GRAY-SCALE CALIBRATION DELAYED TELEMETRY DAYSIDE OF ORBIT 62 TELEMETRY REQUIREMENTS   |
| CH WIDE-ANGLE HIGH-RESOLUTION VIDICON  | BACK ON CDA STATION COMMAND VIA   |
| 29, APPLICATION 29, SPACECRAFT APPL DECD   |   |
| C ACCAL  | 63. ADVANTAGES AND LIMITATIONS  |
| A IN THE FORM OF   | 1   |
| HIGH-RESOLUTION IELEVILATION FICTORES OF EARTH'S COULD COVER, BI<br>TRANSMITTING PRESECONDED TV PICTORES TO COA STATIONS, ***SECOND- | ANG DISTURTION AND INCREASING ACCURACY.  64. REFERENCES   |
|  | 1) FINAL ENGINEERING REPORT TOS A, VOL 1,2,3,RCA ASTRO-ELECTRONICS  |
|  | CONTRACT NO. NAS 5-9034, MAY 5, 1967.***2) SIG ACHIEV IN SPACE  |
| 31. PRINCIPLES OF OPERATION  | AFF 1900. NASA SETISO, 1907.***3) USIKUM,H.: KEVIEM UF A DECADE<br>OF SPACE CAMERA SYSTEMS DEVELOD. POR METROROLOGY. NASA/GSPC.AHG.       |
| THE AVCS, TEST FLOWN ON NIMBUS 1 AND 2 AND OPERATIONALLY ON ESSA   | 1968. ** * t) DATA AVAILABLE FROM NATIONAL WEATHER RECORDS CTR  |
| HAVING 2 CAMBRAS MHITE NIMBRG HAD 3. THE BSGA SYCTEM CONSISTS OF   | (EDDA) ADDIE LLEG N.C.  |
| 2 IDENTICAL 1-INCH VIDICONS HAVING 800 TV LINE RESOLUTION. THE   | SINTLAR TO AVCS ON NIMBHS 1 AND 2. AND ESSA 3.  |
| S PACE-  | 66. DIAGRAMS  |
| CRAPT AND PERPENDICULAR TO THE SPIN AXIS, DURING PICTURE TAKING  |   |
| OPTIC 108 DEGREE WIDE ANGLE LENS WITH A POCAL LENGTH OF 5.7 MM   |   |
| AND AN ELECTROMAGNETICALLY CONTROLLED SHUTTER, THE CAMERA CON-   |   |
| CERTS THE OPTICAL INAGE TO AN ELECTRICAL SIGNAL WHICH IS PRO-  |   |
| AN INHERENT STORAGE PROPERTY WHICH PERMITS A NOMINAL 6.5 SECOND  |   |
| PRAME TIME, CONCURRENTLY WITH SHUTTER ACTUATION, A 16-INCRE-   |   |
| A CONTRAST CHECK, THE CAMERA IS INDEPENDENTLY TRIGGERED INTO   |   |
| OPERATION ONLY WHEN IT COMES IN VIEW OF THE BARTH; THIS IS DONE  |   |
| BY A HORIZON CROSSING INDICATOR (HCI), ONE FOR EACH CAMERA. THE  |   |
| R ORBIT AT 26  |   |
| SECOND INTERVALS WITH A 50 PERCENT OVERLAP.  |   |
| CLCUD COVER OF EARTH (REPLECTED VISIBLE SQLAR RADIATION)   |   |
| 33. MEASUREMENT RANGE  |   |
| DINAMIC BANGE OF 14 TO 11400 FOOT-LAMBERTS 34. PRECISION AND ACCURACY  |   |
| 800 TV-LINE RESOLUTION; 16 LEVELS OF GRAY  |   |

| INSTRUMENT RESUME  | 39. SPECTRAL HANGE 30 O MITCROWS  |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | VIEW 30 • U   |
| CAMBRIDGE, MASSACHUSETTS   | SEE ITEM 31 LIMB-TO-LIMB (4200 NM) FROM 750 NM ALTITUDE   |
|  | 40.ANGULAR RESOLUTIONATI SPATIAL RESOLUTION   |
| LOW-RESOLUTION INFRARED KADLOBETER LEITR (TITLE CONT.)   | 42 POINTING ACCURACY 143 POINTING HATE . 44, ALTITUDE . 45. INCLINATION   |
| 11/10/69   | MED CIRCULAR SI   |
| 3 7. ORGANIZATION  | 46, SPECIAL REQUIREMENTS  |
| PARENT, DR. R.J. UNIVERSITY OF MISCONSIN 608-262-5938 3. CO-INVESTIGATOR 10. ORGANIZATION  | 47. COMPONENTS  |
|  | SENSORS (THERMISTORS), ELECTRONICS, RECORDER  |
| 2. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 14. CONTRACT NUMBER 15. DATE 14. DATE  | 48. WEIGHT 45. VOLUME 16. AVERAGE POWER 51. STANDSV POWER 152. PEAK POWER 153. NIBF                                       |
| 8. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE   | 54 NTTREERING SS NATERERENCE SS NUTERERENCE SS SHIELDING  |
| J.C. NESCZESSA 301-440-  | SENSITIVE FPR T   |
| UNIVERSITY OF WISCONSIN MADISON, WISCONSIN 04/67   | DELAYED TELEMETRY CONTINUOUS  |
|  | REQUIREMENTS  |
| ABDIORETER, FLAT-PLATE IR/VISIBLE LOW-RESOLUTION (20. SPACECRAFT (20. SPACECRAFT   | 90 KBIIS TAPE CAPACITY.   |
| ESSA 5   | 183 ADVANTAGES AND LIMITATIONS  |
| PRIMARY-TO GATHER DATA TO AID IN DETERMINING: (1) THE GEOGRAPHIC   | THE PPR DID NOT GET GOOD DATA STARTS. THUS TIME ERRORS WERE   |
| H AN   | IN MOST READOUTS.   |
| Y FROM THE SUN   |   |
| REFLECTION AND SCATTERING OF SOLAR RADIATION BY THE EARTH-   | 1) FINAL ENGINEERING REPORT TOS A MET SAT SYSTEM, VOL 1. NCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-4034, MAY 5, 1967, ***) |
|  | SOLUTION IR (I  |
| ١  |   |
| THE ESSA PLAT PLATE RADIOMETER SYSTEM, IS DIVIDED INTO 2 BASIC   | 3) ESSA NEWS RELEASE NO. ES 66-54, SEPT 19, 1968.***4) DATA   |
| PLAT PLATE RADIOMETER EMPLOYING A CONE SHIELD TO MINIMIZE OR RE-   | 65. HISTORICAL REMARKS  |
| RADIATION (70 DEG POV).  | THIS RADIOMETER WILL ALSO FLY ON ITOS A. B. C. AND D.   |
| UMINUM DISK THERMALLY  |   |
| RADIATIVELY ISOLATED FROM ITS MOUNTS. THE DISK TEMPERATURE IS  |   |
| SENSED BY 2 INEMALSTONS HOUNTED ON THE BACK SORFACE OF THE DISK.<br>THE HOUSING TEMPERATURES AND THE CONE TEMPERATURES ARE SEPAR-  |   |
|  |   |
|  |   |
| INE BLACK FAINTED SOMFACE WILL MESTOND TO THE SUB OF THE METPLECTED SOLAR, DIRECT SOLAR, AND RERADIATED LONG WAVE RADIATION.   |   |
| LUMINUM SENSOR DISKS REPLECT IN THE VIS  |   |
| BUT ABSORB IR RADIATION IN THE 7 TO 30 MICRON RANGE. THESE RE-   |   |
|  |   |
|  |   |
| REBED TO CORPLETE A SET. TWO SUCH SETS ARE MOUNTED 180 DEG<br>APART ON THE S/C BUT ISOLATED THERMALLY AND RADIATIVELY PROM IT.   |   |
| The state of the s |   |
| ENERGY RADIATED FROM AND REFLECTED BY THE BARTH/ATMOSPHERE   |   |
| 3. MEASUREMENT RANGE   |   |
| PRECISION AND ACCIDACY   |   |
| A. THEUSION AND ACCORDIC   |   |
|  |   |

ESSA 6

|   | INSTRUMENT RESUME   |                      | 35. SPECTRA       |
|---|---|----------------------|-------------------|
| NATIONAL  | NAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS |                      | 38. FIELD OF      |
| 1, TITLE  |   | 2. ACRONYM 3. EXP NO | 40. ANGULAR HE    |
| AUTOMATIC PICTURE-TRANSMISSION SYSTEM   |   | A PT                 | 0.13              |
|   |   | 69/                  |                   |
| 6. PRINCIPAL INVESTIGATOR   | 7. ORGANIZATION 8. TELEPHONE  |                      | 46. SPECIAL       |
| O'BRIEN, J. J. (T. MON)   | GODDARD SPACE FLT CENTER 301-982-   | 301-982-5716         | 47. COMPONE       |
| CONTBACT  | 10 7 10   |                      | 2 VIDIC           |
| 12. TYPE 13. CONTRACT NUMBER  | 14. FLASH INDEX NUMBER 15. DATE   | 16. DATE 17. STATUS  | 48. WEIGHT        |
| 18. MONITOR   | 19. AGENCY 20.PGM OFFICE 21. TELEPHONE  | ONE                  | 54. INTERFERE     |
| GLOVER, J.C.  | SSSA  | 301-440-7543         | SENSITI           |
| 22. VENDOR  | 23 LOCATION   | TE 25.LEAD TIME      | 59. CALIBRA       |
| RCA ASTRO-KLECTRONICS   | PRINCETON, N.J.   | 11/6 / NA            | 62. TELEMET       |
| 5   | AUTOMATIC-PICTURE-TRANSMISSION VIDICON  |                      | THE VID           |
| TION  | 29. SPACECRAFT  |                      | WHICH A           |
| 101   | ESSA 6  |                      | TH 000 h          |
| F-TO PROVIDE  | 1   | RMATION ON           | DIRECT            |
| CLOUD AND WENTERS CON   | *** CONDITIONS OVER A LARGE AREA AROUND   | D THE                | STORAGE           |
| LITE ST   | .Coccourt detrivats carectric c   | 1                    | 1) APT<br>R.A. AN |
| 31. PRINCIPLES OF OPERATION   |   |                      | NASA/GS           |
| THIS SYSTEM, CONSISTING OF TWO IDENTICAL PRAS. WAS ALSO TEST PLOWN ON TIROS 8 AND | ING OF TWO IDENTICAL 1-INCH VIDICON PLOWN ON TIROS 8 AND NIMBUS 1 AND 2                             | CON APT CAM-         | NASA SP           |
| ERATIONALLY FLOWN ON ESSA 2 AND 4.  | EACH CAMERA U   | ATE                  | 65, HISTORIC      |
| KINOPTIC, 108-DEGREE, WIDE-ANGLE<br>POCAL IRNGEH OF S.7 MM. THR THO               | WIDE-ANGLE, F/1.8 OBJECTIVE LENS WITH A   | NS WITH A            | SIMILAR           |
| APART ON THE SIDE OF  | OF THE SPACECRAPT AND PERPENDICULAR TO THE  | R TO THE             |                   |
| SPIN AXIS, SO THEY PO   | SPIN AXIS, SO THEY POINT DIRECTLY DOWNWARD ONCE EVERY 5.5 SECS                                      | Y 5.5 SECS           |                   |
| DUKING WHICH TIME FIG<br>TO TAKE AND TRANSHIT                                     | CTURES ARE TAKEN. THE SISTEM IS<br>A PICTURE EVERY 350 SECS FOR A                                   | TOTAL OF 8           |                   |
| PICTURES, WHILE THE S   | SATELLITE IS IN DAYLIGHT. THE AC  | TUAL PICTURE         | -                 |
| TAKING REQUIRES 8 SECS AND THE MUTE INTERES DESIGN THE UTDICON                    | 8 SECS AND THE TRANSMISSION 200 SECS. DURING  | . DURING             |                   |
| OND, AND THE SIGNALS  | ED PRODUCING AN   | ICTC                 |                   |
| WITH SCAN LINES PERPENDICULAR TO  | ORBIT TRA   | E SHUTTER            |                   |
| CTILIZED IS A MODIFIED TIROS TYPE-F,  | ED TIROS TYPE-F, FULL SCAN, FOCAL-PLANE   | L-PLANE              |                   |
| AITTERS ARE USED, EACH  | PROVIDING A 137.5-MH  | . AN APT             |                   |
| STATION WITH  | APPROPRIATE   | AND                  |                   |
| CORDER CAN RECKIVE IN<br>ACCUTSITION BANGE.                                       | THESE FICTURES WHEN THE SPACECRAF   | T TS WILLIA          |                   |
| 32. PHENOMENA OBSERVED  |   |                      |                   |
| CLOUD AND TERRAIN FEATURES  | OF APPROXIMATELY 2 NM OR  | LARGER               |                   |
| DANAMIC PICTIRE BANGE OF  | P OF 25-1   |                      |                   |
| 34. PRECISION AND ACCURACY  |   |                      |                   |
| S/N OF 30 DB AT 0.7 F   | S/N OF 30 DB AT 0.7 POOT CANDLES/SEC; 10 LEVELS OF GRAY   | RAY                  |                   |
|   |   |                      |                   |

| 0.45 TO 0.65 MICRON NA   |
|--|
| D OF VIEW 39. GROUND SWATH   |
| O BX 89-0 DEG 1800 NR BI 1800 NR FROM RESECUTION OF RESOLUTION ASSOCIATION ASSOCIATION ASSOCIATION DEGLET 1 7 NR PROM 750 NR ASSOCIATION   |
| ıŽ   |
|  |
|  |
| 2 VIDICON CAMERAS, 2 ELECTRONICS MODULES, 2 FM TRANSMITTERS 48. WEIGHT 46. VOLUME 50. AVERAGE POWER   51.51.51.000 POWER   52. MTBF  |
| 55 LB 28 WATTS 40 WATTS  |
| 54. INTERFERENCE 55 INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58 SHIELDING SENSITIVE SPINITIVE  |
| 60, DATA RECOVERY  |
| G2. YELEMETRY REQUIREMENTS REALTIME TELEMBTRY CONTINUOUS DAYTIME   |
| TURN-ON,   |
| FREGUENCY CAPABILITY.  |
| DIRECT TRANSMISSION TO MANY GROUND STATIONS WITHOUT INTERMEDIATE   |
| STORAGE ON MAGNETIC TAPE.  |
| AT WEATHER SAT CTR, 1965.***2  |
| R.A. AND STROUD, W.G.: THE APT TV CAMERA SYSTEM FOR MET SATS.  NASA/GSPC TN D-1915, MOV. 1963, ***3) STNAL ENGINERRING REDORT.   |
| 67. ***** SIG ACHIEV IN SPACE  |
| NASA SP-156.***5) OSTROW, H. AND WEINSTEIN, O.: REVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DEVELOPMENT FOR MET. GSPC, 1968.  |
| CAL REMARKS  |
| SIMILAR TO APT ON TIROS 8, NIMBUS 1 AND 2, AND ESSA 2 AND 4.   |
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| A distribution of the second o |

| NATIONAL AERONANICS AND SACE ADMINISTRATION ELECTRONICS RESERVED ACCE ADMINISTRATION CAMBRIDGE, MASSACHUSETTS TITLE ADVANCED VIDICON CAMERA SYSTEM |                           |                     |
|--|---------------------------|---------------------|
| ICED VIDICON CAMERA SYSTEM   |                           | 38. FIELD OF VIEW   |
| CAMERA SYSTEM  | 2. ACRONYM 3. EXP NO      | 40, ANGULAR RESOLUT |
| -  | Ц                         | 0.17                |
|  | 4. RESUME 5. VERSION      | NG ACC              |
|  | 11/10/69 0004             | 0.0                 |
| 7. ORGANIZATION  | PHONE                     | 46. SPECIAL REQUI   |
| (T.MON) GODDARD SPACE PLT CENTER   | 301-982-5716              |                     |
| 9, CO-INVESTIGATOR 10, ORGANIZATION 11, TELEPHONE  | PHONE                     | 47. COMPONENTS      |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. START 18. CONTRACT   | 16, COMPLETION 17. STATUS | 48 WEIGHT 49.       |
|  | PLT MODEL                 | 43 LB               |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE   | PHONE                     | 54. INTERFERENCE 55 |
| J.C. NESC/RSSA   | 301-440-7543              |                     |
| 23 LOCATION  | OATE 25.LEAD TIME         | 59. CALIBRATION     |
| ECTRONICS PRINCETON, N.J.  | 89/80                     | GRAY SCALF          |
| TRACTOR 1-TNCH GIDE-ANGLE HIGH-REGOLD GIOLD  | TIND                      | RECORDER TO         |
| NOI.   |                           | CRAPT 235           |
| SA .   |                           |                     |
| 36   |                           | 63. ADVANTAGES A    |
| PRIMARY-TO PROVIDE METROROLOGICAL DATA IN THE PORM OF  | OF WIDE-ANGLE             | CAMERA MOUN         |
| HIGH-RESOLUTION TELEVISION PICTURES OF EARTH'S CLOUD COVER   | UD COVER BY               | MIZING DIS          |
| RANSHITTING PRERECORDED TV PICTURES TO CDA STAT  | **** SN                   | 64. REFERENCES      |
| SECONDARY-TO MAINTAIN OPERATIONAL CAPABILITY OF THE  | THE AVES.                 | ICS, CONTRE         |
|  |                           | SPACE APP           |
| 1  | - 1                       | O.: REVIEW          |
| THE AVCS, ON THIS AND THE ESSA 9 SPACECRAFT WAS TEST PLOWN   | ST FLOWN ON               | METEOROLOGY         |
| I ON ESSA S  | ALL AKE SIRIT             | 65. HISTORICAL RE   |
|  | STEM CONSISTS             | TEST PLOWN          |
| IDENTICAL 1-INCH VIDICONS HAVING 833   | TV LINE RESOLUTION.       | 66. DIAGRAMS        |
| THE CAMERAS ARE MOUNTED 180 DEGREES APART ON THE SIDE OF THE   | IDE OF THE                |                     |
| SPACECRAFT AND PERPENDICULAR TO THE SPIN AXIS. DURI  | ING PICTURE-              |                     |
| TAKING SEQUENCE THE CAMERA LOOKS AT THE NADIR. THE   | THE LENS IS A             |                     |
| THE GERM-KINGERIAC TOCK-DREAKER WILDE-ANGER ERNO WILLS A FOCAL FENGING OF  | A FOCAL LENGIN OF         |                     |
| CONVERTS THE OPTICAL TRACE TO AN RIECTRICAL SIGNAL WHICH IS DRO-   | WHICH IS PRO-             |                     |
| CESSED AND RECORDED ON MAGNETIC TAPE RECORDER. THE VIDICON HAS   | VIDICON HAS               |                     |
| AN INHERENT STORAGE PROPERTY WHICH PERMITS A NOMINA  | AL 6.5 SECOND             |                     |
| PRAME-SCAN TIME, CONCURRENT WITH SHUTTER ACTUATION, A 16-INCRE-  | , A 16-INCRE-             |                     |
| MENT GRAY SCALE IS INCLUDED AT THE EDGE OF EACH PIC  | CTURE FRAME AS            |                     |
| A CONTRAST CHECK, THE CAMERA IS INDEPENDENTLY TRIGGERED OPEN AND VIEW OF THE CAMES THAT WITH A PROPERTY.   | GERED INTO                |                     |
| OF EXALLON COLL MAEN II CORES INTO VIEM OF ARE EARLES.<br>MAECHPHYC HADE DECORDED CAN CHORE HE HO HO AS DICHNERS.                                  |                           |                     |
| COVER PICTURES PER ORBIT   | 60-SE                     |                     |
| WITH A 50 PERCENT OVERLAP.   |                           |                     |
| 32. PHENOMENA OBSERVED   |                           |                     |
| CLOUD COVER OF EARTH (REPLECTED VISIBLE SOLAR RADIATION) 33. MEASUREMENT RANGE   | ATION)                    |                     |
| DYNAMIC RANGE OF 14 TO 11,400 FOOT LAMBERTS  |                           |                     |
| 34. PRECISION AND ACCURACY   |                           |                     |
| 833-LINE RESOLUTION, 16 LEVELS OF GRAY   |                           |                     |

| 38. SPECTRAL MANIGE  39. SPECTRAL MASIDE TO 0.65 BICRONS NA 40. MILLSEC  39. O 0.45 TO 0.65 BICRONS NATH  39. O 0.45 TO 0.65 BICRONS NATH  39. O 0.45 TO 0.65 BICRONS NATH  40. NOT DEG 1.5 NM PRR TV LINE AT CENTER FROM 750 NM ALTITUDE.  40. NOT DEG 1.5 NM PRR TV LINE AT CENTER FROM 750 NM ALTITUDE.  40. SPECIAL REQUIREMENTS  41. CAMPONENTS  42. COMPONENTS  43. LB  43. LB  44. SPECIAL REQUIREMENTS  44. SPECIAL REQUIREMENTS  45. SPECIAL REQUIREMENTS  46. SPECIAL REQUIREMENTS  47. COMPONENTS  48. WEIGHT 189. VOLUME 50. AVERAGE POWER 19. STAMON POWER 19. PEAK FOWER 19. MIRET 16. WITCHERERENCE 19. NATHERERENCE 19. NATHERENCE 19. NATHERERENCE 19. NATHERENCE 19. NATHERERENCE 19. NATHER |  |  |
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| EXP NO OOU   | UNC<br>INGLE<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN<br>IN | H OF PREBAPE OND OND PREPAPE OND PREPAPE ON PREPAPER ON PRACK PRAC |

|    |  | INSTRUMENT RESUME   |   | RANGE   |
|----|--|---|---|---|
|    | NATIO  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER   | · NO                                    |   |
|    |  | CAMBRIDGE, MASSACHUSETTS  |   | SER ITEM 31 LIMB-TO-LIMB (4200 NM) PROM 750 NM ALTITUDE                                   |
|    | 1. HILLE   |   | 2 ACHONYM 3. EXP NO                     | 40.ANGULAR RESOLUTION 41. SPATIAL RESOLUTION  |
|    | TITLE CONT.)   | K ED KA DIOENTER  | 4. RESUME 5. VERSION                    | 42. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION                      |
|    |  |   | 11/10/69 0005                           | MED CIRCULAR  |
|    | 6. PRINCIPAL INVESTIGATOR  |   | 8, TELEPHONE                            | 46. SPECIAL REQUIREMENTS  |
|    | PARENT, DR. R.J.   | 10. ORGANIZATION  | 608-262-5938                            | 47. COMPONENTS  |
|    | CONTRACT 13 CONTRACT NILIMED   | TANKS HE STATISTICS HE START  | IR COMPLETION 17 CTATIC                 | 8 SENSORS (THERMISTORS), BLECTRONICS, RECORDER  |
|    |  | ייי דראטד וועבר אינא  | POST PLIGHT                             | 10.00   |
|    | 18. MONITOR  | 19, AGENCY 20, PGM OFFICE   | 21. TELEPHO                             | 94. INTERFERENCE 56. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING         |
|    | GLOVER, J.C.   | NESC/ESSA<br>23 LOCATION  | 301-440-7543                            | 59. CALIBRATION 60. DATA RECOVERY 61. FROUENCY OF OBSERVATION                             |
|    | UNIVERSITY OF MISCONSIN  | +   |   | DELAYED PELEMETRY   |
|    | 26. INSTRUMENT TYPE  |   |   | 62. TELEMETRY REQUIREMENTS  |
|    | RACIONETER, FLAT-PLATE IR/VISIBLE LOW<br>28. APPLICATION   | TE IR/VISIBLE LOW-RESOLUTION   29. SPACECRAFT   | CON                                     | 90 KBITS TAPE CAPACITY.   |
|    | HET 30 BLIBBOSE  | ESSA 7  |   | R. ADVANTACES AND IMITATIONS  |
|    | TO TOTAL OF THE PARTY OF THE PA |   | - 1                                     |   |
|    | PRIMARY-TO GATHER DATA TO ALD IN DETE<br>DISTRIBUTION OF ENERGY HADIATED FROM '  |   | THE FARTH AND THE GEOGRAPHIC            | THE PPE OLD NOT GET GOOD DATA STARTS. THUS TIME ERRORS REFER<br>INCHARD IN MOST READOUTS. |
|    | SHIP OF THIS ENERGY TO INCOMING ENERGY   | TO INCOMING ENERGY PROM TH  | FROM THE SUN AND (2) THE                | 64. REFERENCES  |
|    | REFLECTION AND SCATT   | REFLECTION AND SCATTERING OF SOLAR RADIATION BY THE EARTH-  | 3Y THE EARTH-                           | 1) FINAL ENGINEERING REPORT TOS A MET SAT SYSTEM, VOL 1. RCA                              |
| 47 | ATHOSPHERE SYSTEM.   |   |   | ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, MAY 5, 1967.***2)                              |
| ٥  | 31. PRINCIPLES OF OPERATION  |   |   | DATA FROM ESSA SATELLITES, ESSA TECH REPORT NESC-42, FEB. 68,***                          |
|    | THE ESSA FLAT PLATE RADIOMETER SYSTEM  |   | IS DIVIDED INTO 2 BASIC                 | 3) ESSA NEWS RELEASE NO. ES 66-54, SEPT 19, 1968.***4) DATA                               |
|    | COMPONENTS: A FLAT PLATE RADICMETER W  | LATE RADIOMETER WITH A 180  | ITH A 180 DEG POV, AND A                | AVAILABLE PROM NESC, ESSA, WASH, D.C.   |
|    |  | R EMPLOYING A CONE SHIELD TO  | E SHIELD TO MINIMIZE OR RE-             | BES. HISTORICAL HEMARKS   |
|    | THE HEART OF EACH SENSOR IS A THIN AL  | ANT RESPONSE DUE TO DINECT SOLAN MADIALLY<br>REART OF EACH SENSOR IS A THIN ALUMINUM DI   |   | SE DIAGRAMS   |
|    | RADIATIVELY ISOLATED PROM ITS MOUNTS.  | PROM ITS MOUNTS, THE DISH   | THE DISK TEMPERATURE IS                 |   |
|    | SENSED BY 2 THERRIST   | THERMISTORS MOUNTED ON THE BACK SI  | E BACK SURPACE OF THE DISK.             |   |
|    | THE HOUSING TEMPERATURES AND THE CONE  | URES AND THE CONE TEMPERATIONS  | TEMPERATURES ARE SEPAR-                 |   |
|    | POR THE DISKS BY THE USE OF ANDLIZED   | CADED: 140 SPECIERL RESPON  | ALUMINUM OR BLACK PAINT.                |   |
|    | THE BLACK PAINTED SU   | THE BLACK PAINTED SURPACE WILL RESPOND TO THE SUM OF THE RE-  | SUM OF THE RE-                          |   |
|    | PLECTED SOLAR, DIRECT SOLAR, AND RERA  | T SOLAR, AND RERADIATED LO  | DIATED LONG WAVE RADIATION.             |   |
|    | THE ANODIZED ALUMINUM SENSOR DISKS R   | IN SENSOR DISKS REFLECT IN  | PLECT IN THE VISIBLE RANGE              |   |
|    | SPOND TO THE RADIATED ENERGY FROM THE  | กษ  |   |   |
|    | HIGH DEGREE THE DIRECT AND REPLECTED   | വ   |   |   |
|    | TYPES ARE USED WITH BOTH RADIOMETERS   |   | SO THAT 4 RADIOMETERS ARE               |   |
|    | APART ON THE S/C BUT   | SET. TWO SUCH SETS ARE ISOLATED THERMALLY AND   | MOUNTED 180 DEG<br>RADIATIVELY PROM IT. |   |
|    | 32 PHENOMENA OBSERVED  |   |   |   |
|    |  | FROM AND REPLECTED BY THE EAR   | THE EARTH/ATMOSPHERE                    |   |
|    | 33. MEASUREMENT RANGE  |   |   |   |
|    |  | And a date of the state of the |   |   |
|    | 34. PRECISION AND ACCURACY   |   |   |   |
|    |  |   |   |   |

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| THE STREET   NOTIONAL ARROWANT CAND THE STREET   NOTIONAL CAND THE STREET   NOTION   | NATIONAL AERONAUTICS AND SPACE  |   |                           |
|--|---|---|---------------------------|
| A PET  | ELECTRONICS RESEARCI<br>CAMBRIDGE, MASSACH  | CE ADMINISTRATION H CENTER IUSETTS                  | 티                         |
| APTRANSMISSION SYSTEM  APTRANSMISSION SYSTEM  A. ORGANIZATION  B. TELEPHONE  TO ORGANIZATION  TO ORGANIZATIO |   | 2. ACRONYM  | 40.ANGULAR RESOLUTION     |
| TO PROGRANIZATION  A CORGANIZATION  IN CRODABLE SPACE FLT CENTER 301-982-5716  IN CAGENCY AND SPACE FLT CENTER 301-982-5716  TO CHOANULATION  IN CREANIZATION   | AUTONATIC PICTURE-TRANSMISSION SYSTE  | APT   | 0.132 DEG 1.              |
| CONDONNICATION   STELEHONE   CONDONNICATION   CONTICATION   CONTICATION   CONDONNICATION   CONTICATION   CONTICA   | (TITLE CONT.)   | 0 30  | 42, POINTING ACCURACY 43, |
| TOWNSER AND SPACE FIT CENTER 301-992-5716  TO GRANDENDARD SPACE FIT CENTER 301-992-5716  TO GRANDENDARD SPACE FIT CENTER 301-992-5716  TO GRANDENDARD SPACE FIT CENTER STATUS  TO GRANDENDARD SPACE STATUS  IN AGENCY  IN AG |   | 8, TELEPHONE  | 46, SPECIAL REQUIREME     |
| TINDER REALTINE CLOUD COVER PICTURES OVER A LARGE STITE HOLD IN A NOTICE AND A STATES AND A STAT | SPACE COUNTRY SPACE   |   |                           |
| 12   12   12   12   12   13   13   13  | 10. ORGANIZATION  |   | 47. COMPONENTS            |
| 19 AGENCY   19 AGENCY   20 PGAN OFFICE   1 THE LEPHONE   25 LR   | MON TO A GET  | Н.  | VIDICO                    |
| NUTONATIC-PICTURE-TRANSMISSION VIDICON    NESCLESA   301-440-7543  |   |   | 55 LP                     |
| NONICS PRINCETON N.J. 12/68    |   | 21. TELEPHO   | 54. INTRAFERENCE 55. INT  |
| NUTOMATIC—PICTURE—TRANSMISSION VIDICON    200 STACECHAFT   12/68   12/ | J.C. NESC   | 301-440-7543  | TSNES                     |
| INTOMATIC—PICTURE—TRANSMISSION VIDICON    ESSA 8   | ECTRONICS   | 12/68   |                           |
| TIDE REALTIME CLOUD COVER PICTURES OVER A LARGE SUITABLY EQUIPPED RECEIVING STATION, *** INWTAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYS- INTAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYS- INTAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYS- INTO NOTICON APT CAMERAS, WAS ALSO TEST AND NIRBUS A TAGRA-KINOPTIC, 108-DEG 8 OBJECTIVE LENS WITH A POCAL LENGTH OF 5.7 MM. E MOUNTED 180 DEG APART ON THE SIDE OF THE PROPERSION SOURCE BY S.5 SECS, DURING WHICH TIME PICTURA Y S.5 SECS, DURING WHICH TIME PICTURE SYSTEM IS PROGRAMMED TO TAKE AND THE SIGNAL DAVISIES OF SECS FOR A TOTAL DY CTURE TAKING REQUIRES BUSINSISSION SOO SECS. DURING THIS LATTER PERIOD CANNED AT POUR LINES PER SECOND, AND THE SIGNAL INCINGAR BOUGHES AND STATION WITH INTENNA, RECEIVER, AND A RECORDER CAN ENERGY AND A RECEIVER HAND A RECEIVER AND A RECEIVER HAND A RECEIVER AND A RECEIVER HAND WITH A RECEIVER, AND A RECORDER CAN ARBIER.  IN 137-5-MIZ CARRIER. AN APT GROUND STATION WITH HER SPACECRART IS WITHIN ACQUISTION WITH HER SPACECRART IS WITHIN ACQUISTION WANDER.  RANGE 25:1  RANGE 25:1  RANGE 25:1   | 26. INSTRUMENT TYPE   |   | 62. TELEMETAY REQUIP      |
| INDER REALTIME CLOUD COVER PICTURES OVER A LARGE SUITABLY EQUIPPED RECEIVING STATION, *** INVIAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYS- INVIAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYS- INCH VIDICON APT CARERAS, "AS ALSO TEST BAND NIRBUS I AND 2 AND OPERATIONALLY PLOWN ON EACH CAMERA UTILIZES A TEGRA-KINOPTIC, 108-DEG 8 OBJECTIVE LENS WITH A POCAL LENGTH OF 5,7 MM. EACH CAMERA UTILIZES A TEGRA-KINOPTIC, TO THE SPIN MISS, SO THEY POINT DONCE EVERY 5.5 SECS, DURING WHICH TIME PIC- THE SISTEM IS PROGRAMED TO TAKE AND TRANSMIT DAYLIGHT, THE ACTUAL PICTURE TAKING REQUIRES B BASHIST THACK, THE STOND, AND THE SIGNALS INCHIG AN 800-LINES PER SECOND, SAND THE SIGNALS INCHIG AN AND SHUTTER, AND A RECEIVE HERE THE SPACERRAPT IS WITHIN ACCULSTION RANGE.  N. 137.5-HZ CARRIER, AND A RECORDER CAN RECEIVE HERN THE SPACERRAPT IS WITHIN ACCULSTION RANGE.  RANGE 25:1  RANGE 25:1   | INGER, 1-INCH AUTOMATIC-FICTURE-INA<br>28 APPLICATION   | Z9. SPACECRAFT                                      | WRICH AMPLITU             |
| IDB REALTIME CLOUD COVER PICTURES OVER A LARGE SUITABLY EQUIPPED RECEIVING STATION. ***  INMIAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYS- INCH VIDICON APT CAMERAS, WAS ALSO TEST INCH VIDICON APT CAMERAS, WAS ALSO THEY POUNT INCH WIDED 180 DEG APART ON THE SIDE OF THE BOBJECTIVE LENS WITH A FOCAL LENGTH OF 5.7 MM. INCH BODGE EVERY 5.5 SECS, DURING WHICH TIME PIC- THE SYSTEM IS PROGRAMMED TO TAKE AND THE PROUNT INCH BOOKE EVERY 5.5 SECS, DURING THIS LATTER PERIOD ICANNED AT POUR LINES PER SECOND, AND THE SIGNALS UCTING AN 800-LINE PICTURE WITH SCHULL SCAN, FOCAL-PLANE SHUTTER, ADJUSTED INTERNA, RECEIVER, FOCAL-PLANE SHUTTER, ADJUSTED INTERNA, RECEIVER, AND A RECORDER INTERNA, RECEIVER, AND A RECORDER INTERNA, RECEIVER, AND A RECORDER AND RANGE.  INTERNATION OF AND A RECORDER AND RANGE.  INTERNATION OF AND A RECORDER AND A RECORDER.  INTERNATION OF AND A RECORDER AND A RECORDER.  | E C.  | ESSA 8  | OUIRING 4000 HZ           |
| SUITABLY EQUIPPED RECEIVING STATION. ***  INMAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYSTEMENT CAPENDALY  INCH VIDICON APT CAMERAS, WAS ALSO TEST  INCH VIDICON APT CAMERAS, WAS ALSO TEST  INCH VIDICON APT CAMERAS, WAS ALSO TEST  EACH CAMERA UTILIZES A TEGEA-KINOPTIC, 108-DEG  BOBJECTIVE LENS WITH A FOCAL LENGTH OF 5.7 MM.  IE BOUNTED 180 DEG APART ON THE SIDE OF THE  PERPENDICULAR TO THE SPIN AXIS, SO THEY POINT  ID ONCE EVERY 5.5 SECS, DURING WHICH TIME PIC-  THE SYSTEM IS PROGRAMMED TO TAKE AND THE POINT  JO SECS FOR A TOTAL OF 8 PICTURES, WHILE THE  BAYLIGHT. THE ACTUAL PICTURE TAKING REQUIRES  INSHISSION 200 SECS. DURING THIS LATTER PERIOD  ICANNED AT POUR LINES PER SECOND, AND THE SIGNALS  INSHISSION 200 SECS. DURING THIS LATTER PERIOD  ICANNED AT POUR LINE PICTURE WITH SCAN LINES PER-  IN 137.5-MIZ CARRIER. AN APT GROUND STATION WITH  INTERNA, RECEIVER, AND A RECORDER CAN RECEIVE  HEAN THE SPACECRART IS WITHIN ACQUISTION RANGE.  IN PERTURES OF APPROX 2 NM OR LARGER   | DRIMBRY- TO DROVIDE RESIGNED CLOID  | - 1   | DIRECT TRANSM             |
| NINTAIN CAPABILITY OF THE TOS-ESSA SATELLITE SYS-  TOSA  TOS | AREA AROUND ANY SUITABLY EQUIPPED RE  |   | STORAGE ON MAGN           |
| THE STATE OF THE S | NDARY-  | THE TOS-ESSA SATELLITE SYS-                         | 64. REFERENCES            |
| NASA/GSFC  110N  1 | 2014  |   | R.A. AND STRO             |
| WELL-USED, CONSISTING OP  INCH VIDICON APT CARERAS, WAS ALSO TEST  AND NIMBUS 1 AND 2 AND OPERATIONALLY PLOWN ON  EACH CAMERA UTILIZES A TEGEA-KINOPTIC, 108-DEG  PLOWN ON THE LENS WITH A POCAL LENGTH OF 5.7 Mm.  BENDECTIVE LENS WITH A POCAL LENGTH OF 5.7 Mm.  BENDECTIVE LENS WITH A POCAL LENGTH OF 5.7 Mm.  BENDECTIVE LENS WITH A POCAL LENGTH OF 5.7 Mm.  BENDECTIVE LENS WITH A POCAL LENGTH OF THE POINT  BENDECTIVE TO THE SPIN AXIS, SO THEY POINT  BENDECTIVE TO THE SPIN AXIS, SO THEY POINT  BENDECTIVE TO THE SPIN AXIS, SO THEY POINT  BARPENDICULAR TO THE SPIN AXIS, SO THEY POINT  BARLISTON 200 SECS, DURING WHICH THE PERIOD  CANNED AT POUR LINES PER SECOND, AND THE SIGNALS  BENDECTIVE, THE ACTUAL PICTURE WITH SCAN LINES PRE-  BENDECTIVE, THE SHUTTER WITH SCAN LINES PRE-  BENDECTIVE, THE SHUTTER WITH SCAN WITH  WITH SPACE ARRIER. AN ART TY TRANSHITTERS ARE USED,  137.5-WHZ CARRIER. AN ART TY TRANSHITTERS ARE  HERN FREIVER, AND A RECORDER CAN RECEIVE  HERN THE SPACECRAPT IS WITHIN ACQUISTION RANGE.  RANGE 25:1  RANGE 25:1  RANGE 25:1   | PRINCIPLES OF OPERATION   |   |                           |
| INCH VIDICON APT CARERS, WAS ALSO TEST  AND NIRBUS 1 AND 2 AND OPERATIONALLY PLOWN ON BARD BESTITISES AND OPERATIONALLY PLOWN ON BEDECTIVE LENS WITH A FOCAL LENGTH OF 5.7 MM. REPENDICULAR TO THE SPIN AXIS, SO THEY POINT DONCE PUREY 5.5 SECS, DURING WHICH TIME PIC- THE SISTEM IS PROGRAMED TO TAKE AND TRANSHIT 350 SECS FOR A TOTAL OF 8 PICTURES, WHILE THE DAYLIGHT. THE ACTUAL PICTURE TAKING REQUIRES 8 BASHISSION 200 SECS. DURING THE SIGNALS ICANNED AN FOUR LINES PER SECOND, AND THE SIGNALS ICANNED AN FOUR LINE PICTURE WITH SCAN LINES PER- BUCING AN 80-LINE PICTURE WITH SCAN LINES PER- BUCING AN 80-LINE PICTURE WITH SCAN LINES PER- BUCING AN 80-LINE PICTURE WITH SCAN LINES PER- BUCING AN BOLLINE PICTURE WITH SCAN LINES PER- BULL-SCAN, FOCAL-PLANE SHUTTER AND USED, 137-5-HE CARRIER, AND A RECORDER CAN RECEIVE HERN THE SPACECRAPT IS WITHIN ACQUISTION RANGE.  RANGE 25:1  RANGE 25:1  RANGE 25:1   | THIS SYSTEN, NOW WELL-USED, CONSISTI  |   | SP-15                     |
| RANGE 25:1   | THO IDENTICAL 1-INCH VIDICON APT CAR  | ERAS, WAS ALSO TEST                                 | DECADE OF SPACE           |
| B OBJECTIVE LENS WITH A POCAL LENGTH OF 5.7 MM. REPRENDICULAR TO BE APART ON THE SIDE OF THE BROWNTED 180 DEG APART ON THE SIDE OF THE BROWNED STATES STES, DURING WHICH THEY POINT THE SISTEM IS PROGRAMMED TO TAKE AND TRANSMIT JASO SECS PORA A TOTAL OF B PUCTURES, WHILE THE DAYLIGHT, THE ACTUAL OF B PUCTURES, WHILE THE RESISSION 200 SECS. DURING THIS LATTER PERIOD CANNED AT POUR LINES PER SECOND, AND THE SIGNALS UNCING AN 800-LINE PUCTURE WITH SCAN LINES PER- THE ORBIT TRACK. THE SHUTTER UTILIZED IS A REPOSUBE. TWO 5-WATT TV TRANSMITTERS ARE USED, 137.5-MHZ CARRIER. AN APT GROUND STATON WITH WHYENNA, RECEIVER, AND A RECORDER CAN RECEIVE HEN THE SPACECRART IS WITHIN ACQUISTION RANGE.  RANGE 25:1   | ESSA 2,4, AND 6, EACH CAMERA UTILIZE  | S A TEGER-KINOPTIC, 108-DEG                         | FLOWN ON TIRO             |
| THE 2 CARERAS ARE MOUNTED 180 DEG APART ON THE SIDE OF THE SPACECRAFT AND PERPENDICULAR TO THE SPIN AXIS, SO THEY POINT DIRECTLY DOWNARD ONCE EVERY 5.5 SECS, DURING HICH TIME PICTURES ARE TAKEN. THE SISTEM IS PROGRAMMED TO TAKE AND TRANSHIT A PICTURE EVERY 350 SECS FOR A TOTAL OF 8 PICTURES, WHILE THE SATELLITE IS IN DAVIGHT. THE ACTUAL DICTURE TAKING REQUIRES 8 SECS AND THE TRANSHISTON 200 SECS. DURING THIS LATTER PERIOD THE VILLE OF SCANNED AT POUR LINES PER SECOND, AND THE SIGNALS PRANSHITTED PRODUCING AN 800-LINE PICTURE WITH SCAN LINES PER-PRODUCING AN 800-LINE PICTURE WITH SCAN HILSE CAN BECRIVE THE PROVIDING A 1.5 HILSE CAPOSURE. TWO S-WATT TV TRANSHITTERS ANE USED. THESE PICTURES HEN THE SPACEGRAPT IS WITHIN ACQUISTION RANGE.  AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE THEN APPROPRIATE ANTENNA, RECEIVER AN APPROPRIATE ANTENNA, RECEIVER AND ARBORDAND TERRANGE.  AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE DIAGRAMENT RANGE.  AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE DIAGRAMMENT RANGE.  AN APPROPRIATE RANGE 25.1  AN APPROPRIATE RANGE 25.1  AN APPROPRIATE RANGE 25.1  | RIDE-ANGLE, P/1.8 OBJECTIVE LENS WIT  | H A FOCAL LENGTH OF 5.7 MM.                         | 66. DIAGRAMS              |
| A PICTURE EVERY 350 SECS FOR A TOTAL OF 8 PICTURES, WHILE THE SATELLITE IS IN DAVIGHT. THE ACTUAL OF 8 PICTURES, WHILE THE SECS AND THE TRANSMISSION 200 SECS. DURING THIS LATTER PERIOD THE VIDICON IS SCANNED AT FOUR LINES PER SECOND, AND THE SIGNALS FRANSMITTED PRODUCING AN 800-LINE PICTURE WITH SCAN LINES PER- HODIFIED TIROS TYPE-F, FULL-SCAN, FOCAL-PLANE SHUTTER, ADJUSTED FOR A 1.5 HILSEC EXPOSURE, TWO S-WATT TY TRANSMITTERS ARE USED, BACH PROVIDING A 137.5-WHZ CARRIER, AN APT GROUND STATION WITH A PROVIDING A 137.5-WHZ CARRIER, AN A RECORDER CAN RECEIVE THESE PICTURES HEN THE SPACEGRAFT IS RITHIN ACQUISTION RANGE.  THESE PICTURES HEN THE SPACEGRAFT IS RITHIN ACQUISTION RANGE.  THESE PICTURES HEN THE SPACEGRAFT IS RITHIN ACQUISTION RANGE.  THESE PICTURES HEN THE SPACEGRAFT IS RITHIN ACQUISTION RANGE.  THESE PICTURE RANGE 25.1  THE PROVIDED AND THE RANGE 25.1   | THE 2 CAMBRAS ARE BOUNTED 180 DEG AP<br>SPACECRAPT AND PERPENDICULAR TO THE<br>STEEDSTAY DOGRESS OF STATE | ART ON THE SIDE OF THE SPIN AXIS, SO THEY POINT     |                           |
| A PICTURE EVERY 350 SECS FOR A TOTAL OF 8 PICTURES, WHILE THE SAFELITE IS IN DAYLIGHT. THE ACTUAL PICTURE TAXING REQUIRES 8 SECS AND THE TRANSMISSION 200 SECS. DURING THIS LATTER PERIOD TRANSMITTED PRODUCING AN 800-LINE PERCOND, AND THE SIGNALS TRANSMITTED PRODUCING AN 800-LINE PICTURE WITH SCAN LINES PER- RODIFIED TIROS TYPE-P, PULL-SCAN, FOCAL-PLANE SHUTTER, ADJUSTED FOR A 1-5 HILSEC EXPOSURE. TWO 5-WATT TV TRANSMITTERS ARE USED, AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE THESE PICTURES HERN THE SPACECRAFT IS MITHIN ACQUISTION RANGE.  32. MEASUMEMENT RANGE CLOUD AND TERRAIN PRATURES OF APPROX 2 NM OR LARGER DYMANIC PICTURE RANGE 25:1 34. PRECISION AND ACCURACY   | FORES ARE TAKEN. THE SYSTEM IS PROGR  | AMMED TO TAKE AND TRANSMIT                          |                           |
| SATELLIES IN DAYLIGHT, THE ACTIAL PICTURE TAKING REQUIRES SECS AND THE TRANSMISSION 200 SECS. DURING THIS LATTER PERIOD TRANSMISSION 200 SECS. DURING THIS LATTER PERIOD TRANSMITTED PRODUCING AN 800-LINE PICTURE WITH SCAN LINES PER-F. PULL-SCAN, FOCAL-PLANE SHUTTER, ADJUSTED FOR A 1-5 HILSE EXPOSURE. TWO S-WATT TV TRANSMITTERS ARE USED, ARCH PROVIDING A 137-S-MHZ CARRIER. AN APT GROUND STATION WITH AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE THEN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE THEN AND TERRAIN PRATURES OF APPROX 2 NM OR LARGER.  33 MEASUMEMENT FANGE 25-1  34 PRECISION AND ACCURACY   | A PICTURE EVERY 350 SECS FOR A TOTAL  | OF 8 PICTURES, WHILE THE                            |                           |
| THE VIDICON IS SCANNED AT POUR LINES PER SECOND, AND THE SIGNALS TRANSMITTED PRODUCING AN 800-LINE PICTURE WITH SCAN LINES PER- PENDICULAR TO THE ORBIT TRACK. THE SHUTTER UTILIZED IS A HODIFIED TIROS TYPE-F, PULL-SCAN, POCAL-PLANE SHUTTER, ADJUSTED POR A 1.5 HILSE EXPOSURE. TWO 5-WATT TV TRANSHITTERS ARE USED, AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE THESE PICTURES HIEN THE SPACECRAFT IS HITHIN ACQUISTION RANGE.  33. MEASUMEMENT AND TERRINGS OF APPROX 2 NM OR LARGER DYNAMIC PICTURE RANGE 25:1 34. PRECISION AND ACCURACY   | SATERITY IS IN DAYLIGHT. THE ACTUAL   | PICTURE TAKING REQUIRES 8                           |                           |
| TRANSMITTED PRODUCING AN 800-LINE PICTURE WITH SCAN LINES PER- PENDICULAR TO THE ORBIT TRACK. THE SHUTTER UTILIZED IS A HODIPIED TIROS TYPE-F, PULL-SCAN, FOCAL-PLANE SHUTTER, ADJUSTED POR A 1-5 HILSEC EXPOSURE. THO 5-WATT TV TRANSMITTERS ARE USED, AN APPROPRIATE ANTENNA, RECEIVER, AN APT GROUND STATION WITH AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RECEIVE THENOMENA POSENVED CLOUD AND TERRAIN PRATURES OF APPROX 2 NM OR LARGER  DIAMAIC PLOTURE RANGE 25:1  34. PRECISION AND ACCURACY   | THE VIDICON IS SCANNED AT POUR LINES  | PER SECOND, AND THE SIGNALS                         | **                        |
| TO CHELL THACK, THE SHOTTER UTLIFEED IN THE SHOTTER, TYPE-F, FULL-SCAN, FOCAL-PLANE SHUTTER, EXPOSURE, THE CARRIER, AN APT GROUND STATINERNA, RECEIVER, AND A RECORDER CAN RITHEN ACQUISTION IN PRATURES OF APPROX 2 NM OR LARGER RANGE 25:1   | TRANSHITTED PRODUCING AN 800-LINE PL  | CTURE WITH SCAN LINES PER-                          |                           |
| EXPOSURE, TWO 5-WATT TY TRANSHITTERS AN 137.5-WHZ CARRIER, AN APT GROUND STATINFENA, RECEIVER, AND A RECORDER CAN BEHEN THE SPACECRAPT IS HITHIN ACQUISTION RANGE 25:1   | PENDICULAR TO THE ORBIT TRACK. THE SHODIFIED TIRES TYPE-F. FULL-SCAN. FO                                  | HUTTER UTILIZED IS A<br>CAL-PLANE SHUTTER, ADJUSTED |                           |
| N 137.5-BHZ CARRIER, AN APT GROUND STATION INTERNA, RECEIVER, AND A RECORDER CAN RECEI HEN THE SPACECRAPT IS WITHIN ACQUISTION RA N PEATURES OF APPROX 2 NM OR LARGER CONTROL OF APPROX 2 NM OR LARGER CONTROL OF APPROX 2 NM OR LARGER  | POR A 1.5 HILSEC EXPOSURE. THO 5-WAT  |   |                           |
| HEN THE<br>N PEATUE<br>RANGE 25  |   |   |                           |
| 33. PHENOMENA OBSERVED  CLOUD AND TERRAIN PEATURES OF APPROX 2 NM OR LARGER.  DYNAMIC PICTURE RANGE 25:1  34. PRECISION AND ACCURACY   | HEN THE   | S WITHIN ACQUISTION RANGE.                          |                           |
| 33. MEASUREMY RANGE 25:1 34. PRECISION AND ACCURACY  | 2. PHENOMENA OBSERVED   | 2 NM OB TARGER                                      |                           |
| DYBABIC PICTURE RANGE 25:1 34. PRECISION AND ACCURACY  | 3. MEASUREMENT RANGE  |   |                           |
| SA, THECSION AND ACCOUNT   | DYNAMIC PICTURE RANGE 25:1  |   |                           |
| · · · · · · · · · · · · · · · · · · ·  | A. PRECISION AND ACCURACY   |   |                           |

| 21   1   1   1   1   1   1   1   1   1 |
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| IN STRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION                  | 35. SPECTRAL RA   |
|---|-------------------|
| ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS                              | 38. FIELD OF VIEV |
|   | 40.ANGULAR RESOLL |
| 4   | 0.17              |
|   | ٧٥٥               |
| 6. PRINCIPAL INVESTIGATOR 12. ORGANIZATION A TELEPHONE                            | A6 SPECIAL BEOL   |
| ON) GODDARD SPACE FLT CENTER  |                   |
| 10. ORGANIZATION  | 47. COMPONENTS    |
| 12 CONTRACT   13 CONTRACT NIMBER 14 FLASHINDEX NIMBER 15 START 16 CONTRACT STATUS | 48 WEIGHT 49      |
| DATE  | 43 LB             |
| 19, AGENCY Zo. PGM OFFICE 21, TELEPHO   | 54. INTERFERENCE  |
| J.C. NESC/ESSA 301-440-   |                   |
| RCA ASTRO-RIECTRONICS PRINCETON N. 1. 02/69                                       | GRAV-SCAL         |
| TRUMENT TYPE  | 62. TELEMETRY F   |
|   |                   |
| 29. SPACE   | CRAFT 235-        |
| TRIT ERSP   | OF PICTURE        |
| DETABLE VALUE DECOTOR METPOROLOGICAL DATA IN THE PORM OF SIDE-ANGIR               | CAMERA MOI        |
|   | MIZING DIS        |
| TIONS. ***  |                   |
| SECONDARY- TO MAINTAIN OPERATIONAL CAPABILITY OF THE AVCS                         | 1) PINAL EN       |
|   | ICS, CONTR        |
| 31. PRINCIPLES OF OPERATION   | O REVIES          |
| LI-USED INSTRUBENT, WAS TEST  | METEOROLOG        |
| 1 AND 2 AND OPERATIONALLY ON ESSA 3, 5 AND 7. ALL ARE SIMI-                       | NATIONAL 5        |
| LAR EXCEPT FOR DIFFERENT CAMERA LENSES. THE ESSA/TOS SPACECRAFT                   |                   |
| DATE CARREAD WILLS WINDLOW HAVE BOUND AND STREET CONSISTS OF STREET STREET        | 66. DIAGRAMS      |
| CAMPRAS ARM   |                   |
| SPACECRAPT AND PERPENDICULAR TO THE SPIN AXIS. DURING PICTURE                     |                   |
| TAKING SEQUENCE THE CAMERA LOOKS AT THE NADIR. THE LENS IS A                      |                   |
| TEGEA-KINOPTIC 108-DEGREE WIDE-ANGLE LENS WITH A FOCAL LENGTH OF                  |                   |
| 6.0 MM AND AM ELECTROMAGNETICALLY CONTROLLED SHUTTER. THE CAMERA                  |                   |
| CONVEXTO THE OFFICE INSECTO AN ELECTRICAL SIGNAL WHICH IS PRO-                    |                   |
| AN INHERENT STORAGE PROPERTY WHICH PERMITS A NOMINAL 6.5 SECOND                   |                   |
| PRAME SCAN TIME, CONCURRENT WITH SHUTTER ACTUATION A 16-INCRE-                    |                   |
| MENT GRAY SCALE IS INCLUDED AT THE EDGE OF EACH PICTURE FRAME AS                  |                   |
| A CONTRAST CHECK, THE CAMERA IS INDEPENDENTLY TRIGGERED INTO                      |                   |
| DEPEKATION ONLY WHEN IT COMES IN VIEW OF THE EARTH. THE 4 TRACK                   |                   |
| 12 CLOUD COVER PICTURES PER ORBIT AT 260-5F                                       |                   |
| WITH A 50 PERCENT OVERLAP.  |                   |
| OBSERVED  |                   |
|   |                   |
| DE NAME OF DESCRIPTION OF 12 TO 11 TO DOOR-TANDERS                                |                   |
| 34. PRECISION AND ACCURACY  |                   |
| 833-LINE RESOLUTION, 16 LEVELS OF GRAY  |                   |
|   |                   |

| 1             |  |
|---------------|--|
|               | SPECTRAL RAUGE<br>0,45 TO 0,65   |
|               | 38. FIELD OF VIEW 39.0 DEG 1700 NM BY 1700 NM FROM 750 NM ALTITUDE   |
| 0             | 40.ANGULAR RESOLUTION 41, SPATIAL RESOLUTION  0, 17 DRG 1, 5 NR PER TV LINE AT CENTER PROM 750 NM ALTITUDE                 |
| ě             | ITING ACCUPACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION  |
| <del>.</del>  | 0.5 DEG   MRD CIRCULAR SUN-SYNCH RETROGRADE  |
|               | 1) CAMBONEARS  |
| _             |  |
|               | WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDBY POWER 52.  |
| $\overline{}$ | 43 LB MAGNETIC SO NUCCEAR ST. CHERMAL SS SHIELDING   |
|               | SENSITIVE MAGNETIC SHIEL   |
| _             | 58. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION COLUMN CALL DATA TO A DATA WOR MOTORISMON NAVOTAD OF A DATA |
| TĒ            | UNISIDE  |
| ပြ            | DER IS PLAYED BACK ON CDA STATION COMMAND VIA THE S  |
| _             | TIME FOR A FULL O  |
| 1             | DVANT  |
| ы             | MOUNTING ALLOWS PICTURES I   |
|               | MIZING DISTORTION AND INCREASING ACCURACY.   |
|               |  |
|               | CONTRACT NO. NAS 5-9034, MAY 5,1967. **2) SIG ACHI   |
|               | E APP 1966. NASA SP-156, 1967. ***3)   |
|               | O. REVIEW OF A DECADE OF SPACE CARREA SYSTEMS DEVELOPMENT FOR METROPOLOGY NASAZONET AND 1968 ***                           |
|               | HEVILLE, N.C.  |
|               |  |
|               | PLOWN ON NIMBUS 1, 2 AND RSSA 3, 5 AND 7.  |
|               | 66. DIAGHAWS   |
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| INSTRUMENT RESUME  NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  ELECTRONICS RESEARCH CENTER  CAMBRIDGE, MASSACHUSETTS  2. ACRONYM 3. EXP NO  (TITLE CONT.)  (TITLE CONT.)  (FITLE CONT.)  (A. RESUME | 30. SPECTRAL FANCE   30. 0   NICRONS   SPECTRAL RESOLUTION   37.TIME   |
|--|--|
| T NUMBER 14 FLASH INDEX NUMBER 15 START INDE | 42. COMPONENTS  48. SENSORS (THERMISTORS), ELECTRONICS, RECORDER  49. WIGHT   P. VOLUME   P. AVERAGE POWER   BISTANDBY FOWER   ST. PEAK FOWER   St. INTERFERENCE   ST |
| PELBOTA 19 THE BOATA TO AID IN DETERMINING: (1) THE GEOGRAPHIC DISTRIBUTION OF BURRGY RADIATED FROM THE EARTH AND THE RELATION—STIP OF THIS BURRGY TO INCOMING ENBERT PROM THE EARTH AND THE RELATION—STIP OF THIS BURRGY TO INCOMING ENBERT PROM THE SUN AND (2) THE REPERCTION AND SCATTERING OF SOLAR RADIATION BY THE EARTH—THE STATEM.  3. PRINCIPLES OF OPERATION  THE BESAL PLATE RADIOMETER SYSTER, IS DIVIDED INTO 2 BASIC COMPONENTS: A FLAT PLATE RADIOMETER WITH A 180 DEG FOV, AND A PLATE RADIOMETER EMPLOYING A CONE SHIELD TO MINHIZE OR REMOVE ANY RESPONSE DUE TO DIRECT SOLAR RADIATION (70 DEG POV).  THE HEART OF BACK SENSOR IS A THIN ALUMINUM DISK THERMALLY AND RADIATIVEL ISOLATED FROM ITS MOUNTED ON THE BACK SURPERS OF THE PISK THERMALLY AND FROM ITS MOUNTED ON THE BACK SURPACE OF THE PISK. THE PLACK PAINT.  THE HEART OF BY THE USE OF ANODIZED ALUMINUM OR BLACK PAINT.  THE BLACK PAINTED SURFACE WILL RESPONSES ARE PROVIDED FOR THE BURRET SOLAR, AND RECORDED. TWO SPECTRAL RESPONSES ARE PROVIDED THE SURFACE WILL BENEFIT HAND EXCLUDE TO THE RADIATION. BOTH DISK THE ANODIZED ALUMINUM SENSOR DISKS REPLECT IN THE VISIBLE RANGE SPOND TO THE RADIATED ENERGY FROM THE EARTH AND EXCLUDE TO A HIGH DEGREE THE DIRECT AND REPLECTED SOLAR, BURBEL THE BALL THE BALL THE BALL THE BOTH REPLECTED SOLAR RADIATED BURBELECTED SOLAR RADIOMETERS ARE USED WITH BOTH REPLECTED SOLAR RADIOMETERS SO THAT 4 RADIOMETERS ARE NEEDED TO COMPLETE A SET. TWO SUCH SETS ARE NOUNTED 180 DEG  | THE FPR DID NOT GET GOOD DATA STARTS. THUS TIME ERRORS THE FPR DID NOT GET GOOD DATA STARTS. THUS TIME ERRORS INCURRED IN MOST READOUTS.  64. REFERENCES  65. REFERENCES  65. REFERENCES  66. DATA FROM ESSA STELLITES. ESSA TECH REPORT NESC-42, FE  66. DATA FROM ESSA SATELLITES. ESSA TECH REPORT NESC-42, FE  67. WAILABLE FROM NESC, ESSA, WASH, D.C.  68. HISTORICAL REMARKS  THIS RADIOMETER WILL ALSO FLY ON ITOS A, B, C, AND D.  66. DIAGRAMS   |
| 33. PHENOMENA OBSERVED 33. MEASUREMENT RANGE 34. PRECISION AND AUDREPLECTED BY THE EARTH/ATMOSPHERE 34. PRECISION AND ACCURACY   |  |

|   | 1 1  | 38. SPEC<br>38. FIELD<br>180.         |
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|   |  | 40.ANGULA                             |
| LOW-RESOLUTION OMNIDIR<br>(TITLE CONT.)         | OMNIDIRECTIONAL RADIOMETER LROR<br>4. RENE   S. VERNOW   | NA<br>42, POINTIN                     |
|   |  | NA                                    |
| LINVESTIGATOR                                   |  | 46. SPECI                             |
| 9. CO-INVESTIGATOR 10                           | UNIVERSITY OF WISCONSIN 608-262-5938 10. ORGANIZATION  | 47. COMP                              |
| 12. CONTHACT 13. CONTRACT NUMBER                | 14. FLASH INDEX NUMBER 115 START 116 CONTESTION 17. STATES   | 5 MIR                                 |
| +   | DATE   |                                       |
| 18. MONITOR                                     | VCY 20.PGM OFFICE 21. TELEPHO  | S4. INTER                             |
| 22 VENDOR                                       | NASA HDOTRS OSSA/SG 202-962-3825   | 59. CALIE                             |
| UNIVERSITY OF WISCONSIN                         | MADISON, WISCONSIN 10/59 NA  | 82 TEL                                |
| ~   | OMNIDIRECTIONAL NON-SCANNING LOW-RESOLUTION UNC  | DATA                                  |
| PLICATION                                       | 29. SPACECRAFT   | NATUR                                 |
| 30. PURPOSE                                     | EXPLORER 7   | 10 HZ                                 |
| PRIMARY-TO MEASURE THE                          | GROSS HEAT BUDGET OF THE   | NO DA                                 |
| SECONDARY-TO DETERMINE BEEFEGEN AND PRITTED     | HOW MUCH SOLAR ENERGY IS ABSORBED,   | RECEI<br>64. REFE                     |
| 9   | 7  | 1) JUN                                |
| 31. PRINCIPLES OF OPERATION                     |  | FOR S                                 |
| EXPERIMENTS SIMILAR TO                          | EXPERIHENTS SIMILAR TO THIS WERE ALSO FLOWN ON TIROS 3,4, AND 7.   | CENTE                                 |
| BOLOMETERS IN THE FORM                          | THE. H   | 65. HISTO                             |
| SPHERES ARE THERMALLY                           | OXIMITY T  | ANEA                                  |
| SPECIALLY ALUMINIZED MIRRORS. THESE             | MIRRORS. THESE MIRROR BACKED BOLOMETERS ARE  | 66. DIACE                             |
| TURE IS REASURED BY A                           | GLASS COATED BEAD THERMISTOR MOUNTED ON  |                                       |
| SPRE  | IS MADE TO MEASURE   |                                       |
| TURE OF THE MIRRORS, TWO OF THE                 | 140 OF THE HEMISPHERES HAVE A BLACK COATING  |                                       |
| THIRD HEMISPHERE, WHITH                         | TERRESTRIAL BADI   | _                                     |
| TION THAN TO SOLAR RAD                          | SOLAR RADIATION, A FOURTH WITH A GOLD METAL SURFACE  |                                       |
| IS NORE SENSITIVE TO S                          | SENSITIVE TO SOLAR RADIATION THAN TO TERRESTRIAL RADIA-<br>BIACK EDURED ON THE AVIC OF THE CAMELITY AT THE TOP |                                       |
| TO DET  | IN THE MIRROR SURFA  |                                       |
| HIT   | WITH BLACKENED HEMISPHERES. A SMALL TABOR-SURFACED   |                                       |
| HEMISPHERE, PROTECTED                           | STRUCTED FROM DIRECT SUBLIGHT CAN BE USED TO MEA-  |                                       |
| R BARTH'S                                       | TION CURRENTS ARE OBTA   |                                       |
| USING THESE TEMPERATURES 32. PHENOMENA OBSERVED | RES IN HEAT BALANCE EQUATIONS.   | · · · · · · · · · · · · · · · · · · · |
| SOLAR AND TERRESTRIAL RADIATION                 | RADIATION  |                                       |
| 128 DRG K TO 488 DRG K                          |  |                                       |
|   |  |                                       |
| O. 1 KELVIN DEGREE                              |  |                                       |
|   |  |                                       |

|          | 36. SPECTRAL RESOLUTION 37. TIME CON   |
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|          | 138. FIELD OF VIEW 39. GROUND SWATH  |
|          | 180.0 DEG 300 NM RADIUS CIRCLE PROM 375 NM ALTITUDE  |
| EXP NO   |  |
| 1        | NA CONTRACTOR OF THE CONTRACTO |
| NO CO    | AS. POINTING PAIR AS. ALITODE AS. INCLINATION  |
| 1000     | SPECIAL REQUIREMENTS   |
|          | 2) COMBONIENTS   |
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| IGHT     | Н  |
|          | E 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING   |
| TIME     | 59. CALIBRATION 60. DATA RECOVERY STEROUS STEROUS OF OBSERVATION   |
|          | REALTIME TELEMETRY   |
| SECURITY | METRY REQUIREMENTS   |
| UNC      | DATA SENT ON THE 730 HZ SUBCARRIER IN THE PORM OF A LEN-BIT NATURAL BINARY-CODED HORD, BANDWINTH HERD FOR TRANSMISSION IS  |
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| T        | The state of the s |
|          | NO DATA STORAGE, DATA LIMITED TO TIME WHEN SATELLITE IN VIEW OF REPORTATION  |
|          | 64. REFERENCES   |
|          | VOL 1. EXPLORER 7  |
|          | CODE AND CALIBRA   |
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|          | FROM NAUR AND AN CONSOROR BROCKE   |
| Ω.       | UNIV. OF WISCONSIN, DEC. 1968.   |
|          |  |
| TO       | AN EARLY VERSION OF A RADIOMETER USED ON TIROS AND ESSA S/C.   |
| PERA     |  |
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| NATIO                            | INSTRUMENT RESUME   |                  |
|                                  | ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS   | NA FIELD OF V    |
| 1. TITLE                         | 2. ACHONYM 3. EXP NO  | 40.ANGULAR RES   |
| ASSIVE                           | H   | NA               |
| (TITLE CONT.)                    |   | 42. POINTING AGO |
| 6. PRINCIPAL INVESTIGATOR        | 7. ORGANIZATION 8. TELEPHONE  | 46, SPECIAL RE   |
| STANLEY, H. R.                   | S STATION   |                  |
| 9. CO-INVESTIGATOR               | 10. ORGANIZATION 11. TELEPHONE  | 47. COMPONEN     |
| 12. CONTRACT 13. CONTRACT NUMBER | 14. FLASH INDEX NUMBER 15. START 16. CONFESTION   | 48 WEIGHT        |
|                                  |   |                  |
| ROSENBERG, J.D.                  | 0SSA/SCG 202-963-   | D4. INTERPREEN   |
| 22. VENDOR                       | 23. LOCATION 24, PLATE 15. LEAD TIME  | 59. CALIBRATI    |
| 26. INSTAUMENT TYPE              |   | 62. TELEMETR     |
| REFLECTOR, C-BAND PI             | PASSIVE   | I                |
| 28. APPLICATION                  | 81  |                  |
| G E OD                           | GEOS 2  | 63. ADVANTAG     |
| PRIMARY-TO ALLOW A P             | 184   |                  |
| INTERNAL TIME DELAY:             | INTERNAL TIME DELAY; USED IN CONJUNCTION WITH THE C-BAND TRANS-<br>PONDER ***SECONDARY-TO PROVIDE DASSIVE C-BAND TRACKING CADARIL | 64. BEFERENCE    |
| ITIES                            | TUPCUTUO  | 1) NASA P        |
|                                  |   | U                |
| 31. PRINCIPLES OF OPERATION      |   | ANALYSIS         |
| PASSIVE C-BAND                   | REPLECTOR IS INCLUDED ON THE SPACEC   | R-4035-5         |
| DONDER TO DETERMINE ACC          | ACCURATELY THE LONG-TERM EFFECTS OF COM-  | 65. HISTORICA    |
| TRANSPONDER SYSTEM.              | TRACKING THE SATELLITE WITH   | GEOS 2 I         |
| AND PASSIVE SYSTEMS              | SYSTEMS DURING THE SAME PASS, THE CORRECTIONS TO THE  | 66. DIAGRAMS     |
| ALEO PERMIT C-BAND 1             | ACTIVE SISTEM MAI DE ACCUMATEU DETERMINED. THE SISTEM WILL<br>ALSO PERMIT C-BAND TRACKING OF THE SATELLITE ON PREDIENCIES         |                  |
| OTHER THAN THE TRANS             | OTHER THAN THE TRANSPONDER INTERROGATE PREQUENCY THUS ENABLING  |                  |
| GREATER TRACKING COV             | COVERAGE WITHOUT ADDITIONAL DRAIN FROM THE SYSTEM.  |                  |
|                                  |   |                  |
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| 1 # 1                            |   |                  |
| 33. MEASUREMENT RANGE            | SSIONS PROM GROUND STATIONS   |                  |
| 7.00                             |   |                  |
| 30 DR BOTHT TG 35 DE             | AS DEC PROM MAIN-BRAM DIRECTION   |                  |
| 30 UN KATOR 45 C                 | HALN - DEBR   |                  |

|         | 36. SPECTRAL HANGE 36. SPECTRAL HESOLUTION .37. TIME CONSTANT         |
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|         | NA FIELD CF VIEW 134 GROUND SWATH                                     |
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| 003     | MED ECCENTRIC   |
|         | PECIAL REQUIREMENTS   |
|         |   |
|         | 17. COMPONENTS  |
|         | -BAND PASSIVE REFLECTOR   |
|         | GE POWER SILSTANDBY POWER SS PEAK POWER SS MTE                        |
| NAL     | - 1   |
| 7       | FERENCE   |
| ų       | FOR CALIBRATION ON THE SECURITY OF DECENTATION                        |
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| UNC     | N. W.                             |
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|         | 83. ADVANTAGES AND LIMITATIONS  |
| <br>04  |   |
| S       |   |
| 1       |   |
|         | SA PRESS KIT FOR GEOS-2, RELEASE NO: 68-2K, JAN 7, 68                 |
|         | OF OPERATIONS FOR THE GEOS-13 SPACECRAFT. REPORT                      |
| 7       | CATIONS   |
| ]_      | ANALYSIS FOR FUTURE GRODELIC SPACECRAFT DEVELOPMENT, REPORT NO.       |
|         | Commontantions and Statems, INC. DAN                                  |
|         | 66. HISTORICAL REMARKS  |
| <br>0   | S. MECHA  |
| HE      | A LS ALSO DROWN AS SAFLORES   |
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| TITLE  C-BAID TRANSPONDER  LECTRONICS AND SPACE ADMINISTRATION  C-BAID TRANSPONDER  C-COMPONENTS  C-BAID TRANSPONDER  C-BAID T | SEE ITER 31  38. FIELD OF VIEW  38. FIELD OF VIEW  NA  48. SPECIAL RESOLUTION  AS SECIAL RESULT OF TRANSPONDERS  49. INTERFERENCE   SO. INTERFERENCE   SO |
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| CAMBRIDGE, MASSACHUSETTS  CAMBRIDGE, MASSACHUSETTS  1. ORGANIZATION  10. ORGANIZATIO | A ARABERTA CONTRIVIOR AT A LATITORS  A A ALTITUDE  1. SPECIAL REQUIREMENTS  COMPONENTS  CO |
| TOUMBER 14. FLASH INDEX NUMBER 19. STATE PHONE  10. ORGANIZATION   | ANOUTAN RESOLUTION AND THE RESOLUTION AND THE RECEIVED BY THE  |
| TOUMBER 14 FLASH INDEX NUMBER 15 SAGE 10 OF STATION  10. ORGANIZATION  10. ORGANIZAT | A SPECIAL REQUIREMENTS  COMPONENTS  COMPON |
| TOURSEN TO DETERRING THE RECORD TO BE THE RECORD TO THE RECORD TO BE THE RECORD TO THE RECORD TO BE THE RECORD TO THE RECORD | SPECIAL REQUIREMENTS  COMPONENTS  COMPONEN |
| TOURGANUZATION  10. ORGANUZATION  10. ORGANUZATI | ABECUMEMENTS  COMPONENTS  COMPONENTS  COMPONENTS  COMPONENTS  B LB  WEIGHT 49, VOLUME  B LB  WEIGHT 40, VOLUME  B LB  WEIGHT 40, VOLUME  B LB  WEIGHT 40, VOLUME  S ANTERIAL  S ANTER |
| NASA WALLOPS STATION  10. ORGANIZATION  11. AGENCY  11. AGENCY  12. AGENCY  13. AGENCY  14. FLASH INDEX NUMBER   N. SAAFE   18. CONTING   OPERATIONAL    15. AGENCY  16. AGENCY  17. TELEPHONE  18. AGENCY  18. AGENCY  ABS  18. CONTING   OSSA/SCG   202-963-3361    18. CONTING   OSSA/SCG   ON TELEPHONE    18. CONTING   OSSA/SCG   ON TELEPHONE    18. CONTING   OSSA/SCG   ON TELEPHONE    18. CONTING   ON TELEPHONE    18. CONTING | COMPONENTS  VEGA MODEL 313C TRANSPONDERS WEIGHT IS VOLUME  B LB  WEIGHT IS VOLUME  B LB  WITHER FEBRES IS MYSTERIAL STANDSVINGER IS STANDSVINGER IS MYSTER IN THE MATER IS SOO HATTS  OURCE NONE NONE NONE SO DATA RECOVERY  STELEMETRY REQUIREMENTS  BE ITEM 31  REFERENCES  NASA PRESS KIT FOR GROS-B. RELEASE NO. 68-2K, JAN 7, 68.***2)  NASA PRESS KIT FOR GROS-B. RELEASE NO. 68-2K, JAN 7, 68.***2)  PARAMETRIC ANALYSIS DOR FUTURE GROST NO. 68-2K, JAN 7, 68.***2)  |
| THACT NUMBER 14. FLASH INDEX NUMBER 15. SARET 16. CONCANIZATION  THACT NUMBER 14. FLASH INDEX NUMBER 15. SARET 16. CONCANIZATION 17. TELEPHONE  18. AGENCY 20. CO. S. S. A. S. C.  | COMPONENTS  VEGA MODEL 313C TRANSPONDERS  WEIGHT AS VOLUME BUT AS AVERAGE POWER IS STANGEV FOWER 125. FEAK FOWER IS MITER  B LB  WAGNETERS INTERPRETED BY AVERAGE POWER IS STANGEV FOWER IS MITER  INTERPRETED BY AND BUT INTERPRETED BY INTERPRETED B |
| NTRACT NUMBER 14. FLASH INDEX NUMBER 15.5MAR 10.5MAR 1 | WEIGHT AS VOLUME BY AVERAGE POWER IS STANGOV FOWER 32. PEAK POWER S2. MTGF  B. LB.  B. LB.  NATURE S2. DO HATTS  OUNCE.  CALIBRATION  ONE  TELEMETRY REQUIREMENTS  REFERENCES  NONE  RADIATES  NONE  ADVANTAGES AND LIMITATIONS  REFERENCES  NOTE  NOTE  NOTE  ADVANTAGES AND LIMITATIONS  NASA PRESS KIT FOR GROS-B. RELEASE NO: 68-2K, JAN 7, 68.***2)  NASA PRESS KIT FOR POR PUTURE GROUPERS TO STANGE STANGE TO STANGE TO STANGE STANGE TO STANGE STAN |
| TTRACT NUMBER   14 FLASH INDEX NUMBER   15 STATUS   OPERATIONAL    15 AGENCY   20 FOR OFFICE   21 TELEPHONE   22 C-963-3361    26 C-BAND VRGA HODEL 313 C   22 STACECHAFT   24 Colorion    27 C-BAND VRGA HODEL 313 C   26 STACECHAFT   25 COLORION    28 USED FOR RANGE BADAR CALIBRATION AND DATA RECORD-RIBBRATION AND DATA RECORD-RIBBRATION OF THE SADAR SADAR SADAR CALIBRATION OF THE SADAR SADAR CALIBRATION OF THE SADAR SADAR CALIBRATION OF THE SADAR SADAR SADAR CALIBRATION OF THE SADAR SADAR SADAR CALIBRATION OF THE SADAR | WEIGHT 16 VOLUME 50 AVERAGE POWER 61.81 AND 92 FEAR POWER 53 MTBF  8 LB  8 LB  10 MATCHER 10 MACHER 10 MATCHER |
| 10 PERATIONAL  D. NASA HOOTES OSSA/SCG 202-963-3361  23 HOOTES OSSA/SCG 202-963-3361  24 HOOTES OSSA/SCG 202-963-3361  25 C-BAND VEGA HODEL 313 C 20. SPACECHAFT  E USED FOR RANGE BADAR CALIBRATION AND DATA RECORD-RIBBRATION AND DATA RECORD-RIBBRATION AND DATA RECORD-RIBBRATION OF THE SADAR   | B LB   WARGNETCE   WARGNETCE   WARGNETCE   WARGNETCE   WARGNETCE   WARGNETCE   WARGNETCE   WARGNETCE   WARGNETCE   WONE   WONE   WONE   WONE   WONE   WONE   WONE   WONE   WONE   WARGNETCH   WARGNE   |
| 19 AGENCY  | NOTORE INTERFERENCE 10. INTERFERENCE INTERPRETATION ONE 1. TELEMETRY REQUIREMENTS  ER ITEM 31  REFERENCES AND LIMITATIONS  NASA PRESS KIT FOR GROS-B. RELEASE NO: 68-2K, JAN 7, 68.***2)  NASA PRESS KIT FOR GROS-B. RELEASE NO: 68-2K, JAN 7, 68.***2)  PROPERTIES ANALYSIS COMMITATIONS AND SYSTEMS TOWN FOR THE PROPERTY.  |
| D. INASA HOURS OSSA/SCG 202-933361  ON LABS VIENNA, VA. 01/68 NA SIGNAL  C-BAND VEGA HODEL 313 C 20. SPACECRAFT DNC  BUSED FOR RANGE RADAR CALIBRATION AND DATA RECORD-RIBBRATION TO DETERMINE THE ACCURACY OF THE RADAR CALIBRATIONS  | NONE NONE (80. DATA RECOVERY REQUIREMENTS 31 AND LIMITATIONS SSS KIT FOR GROS-B. RELEASE NO: 68-2 ANALISIS POR PUTURE GEODETIC SPACE   |
| 2 C-BAND VEGA HODEL 313 C  2 C-BAND VEGA HODEL 313 C  2 C-BAND VEGA HODEL 313 C  3 SPACECHAFT  GEOS 2  RUSED FOR RANGE RADAR CALIBRATION AND DATA RECORD- RIBBRITION AND DATARECORD- RADAR TANDER TO DETERMINE THE ACCURACY OF THE SADAR   | AND LIMITATIONS  SS KIT FOR GROS-B. RELEASE NO: 68-2  ANALISIS POR PUTURE GEODETIC SPACE  ANALISIS OF PUTURE GEODETIC SPACE  ANALISIS OF PUTURE GEODETIC SPACE   |
| 2 C-BAND VEGA HODEL 313 C  120. SPACECHAFT  GEOS 2  B USED FOR RANGE RADAR CALIBRATION AND DATA RECORD- RIBBRATION TO DETERMINE THE ACCURACY OF THE SADAR  | 31 SAND LIMITATIONS ESS KIT POR GROS-B. RELEASE NO: 68-2 C DANALYSIS POR PUTURE GEODETIC SPACE C DANALYSIS POR COMMITTANTONE AND CA  |
| HIDER, 2 C-BAND VEGA HODEL 313 C  TION  GEOS 2  GEOS 2  TO BE USED FOR RANGE RADAR CALIBRATION AND DATA RECORD- REPRESENTATION TO DETERMINE THE ACCURACY OF THE RADAR BOD COMMENCE AND CONTINUE THE ACCURACY OF THE RADAR  | 31  LAND LIMITATIONS  ESS KIT POR GRO  C ANALYSIS POR  |
| -TO BE USED FOR RANGE RADAR CALIBRATION AND DATA RECORD-   | ESS KIT POR GRO  |
| -TO BE USED FOR RANGE RADAR CALIBRATION AND DATA RECORD- REPERIEBENTATION TO DETERMINE THE ACCURACY OF THE RADAR BOD COMMONDED AND CONTINUED COURSES THE RADAR   | ESS KIT POR GRO  |
| -TO BE USED FOR RANGE RADAR CALIBRATION AND DATA RECORD-<br>REPERTREMENTATION TO DETERMINE THE ACCURACY OF THE RADAR<br>BOD COMMENDED AND CONTINUED COURSES TWINGSTED AND CONTINUED COURSES TWINGSTED AND CONTINUED COURSES TWINGS   | ESS KIT FOR GRO  |
| HE ACCURACY OF THE RADAR   | ESS KIT FOR GROC ANALYSIS FOR  |
| DADOR THURST SATONS  | ESS KIT FOR GEO<br>C ANALYSIS FOR  |
| GEOUGS! INVESTIGATIONS.  | NASA PRESS KIT FOR GROS-B. RELEASE NO: 68-2K, JAN 7, 68.***2) ARAMETRIC AALI'SIS POR FUTURE GEODETIC SPRECRAFT DEVELOPMENT. PROSE NO. 9-1036-60-3  |
| PASSIVE REPLECTOR EXPERI-  | ARAMETRIC ANALYSIS POR FUTURE GEODETIC SPACECRAPT DEVELOPMENT.   |
| HENT. PARAMETRIC ANALYSIS  |  |
| 11 PRINCIPLES OF CHESSATION N. 4.0.25-51   | THE STREET PROPERTY OF STREET  |
| CONTRACTOR OF THE PROPERTY OF THE PARTY OF T | +++3) FLAN OF OFERALITONS FOR THE GEOS-B SPACECRAFT. REPURF NO. R-   |
| NUMBER C-BAND IRANSFUNDERS 4033-43-2,  | CONGUNICATIONS SISTEMS, INC. OCI.  |
| VECA COLDE 31-0/ : III INA NOVENUE NATE DENILOR EACLET FOR THE TARGET OF T   | S. HISTORICAL REMARKS  |
| COOMDED UNG THE DEN CRUTHY   | AC GOOD AT ALCO VANCAN AS EVELOPED DE  |
| ATTON PREDIENCY IS 5690  | DIAGRAMS   |
| NITURA IS 5765 MHZ. THE  |  |
|  |  |
| A CROSSIAN STARTSON PIGHT ALCROSSCOUNDS APPER PROFILE  |  |
| MINTERNAL GATING PUL   |  |
| THIS GATING PULSE IS PRESENT, THE SECOND GROUND PULSE WILL GEN-  |  |
| ERATE A RETURN PULSE AFTER A PIXED 4 OR 5 MICROSECOND DELAY  |  |
| (DEPENDING UPON WHICH OF THE TWO TRANSPONDERS IS IN OPERATION).  |  |
| THE TIME REQUIRED  |  |
| THE BOUND THIS FEED HE FIRED DELAH IN THE SPACECHEM STREET THE   |  |
|  |  |
| PONDESS. IN ORDER TO DETERMINE ACCURATE THE STATE OF THE  |  |
| OF AGING AND RADIATION UPON THE TRANSPONDER SYSTEM, DATA IS COM-   |  |
| IVE C-BAND REFLECTO  |  |
| OF THE SOURCE OF |  |
| RP REANSHISSION PROM GROUN STATIONS AT 5690 MHZ  |  |
| 33. MEASUREMENT RANGE  |  |
| RANGE GREATER THAN 4000 NM   |  |
| 34. PRECISION AND ACCURACY   |  |
|  |  |

| IN STRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS ERESEARCH CENTER CAMBRIDGE MASSACHUESTRS  | 38. FIELD OF VIEW 38. GROUND SWATH  |
|--|---|
| 1. TITLE 2.ACRONYM 3. EXPINO   | 49. ANGULAR RESOLUTION 11. SPATIAL RESOLUTION   |
|  |   |
| 11/10/69 0003  | AZ PONTING ACCURACY AS, POINTING HATE AT ALTITODE 42, INCLINATION NA NA MED ECCENTRIC HIGH RETROGRADE                       |
| 8. TELEPHONE   | PECIAL HEQUIREMENTS   |
| . NAVAL WEAPONS LABORATORY   |   |
| 9, CO-INVESTIGATOR 10, ORGANIZATION 11, TELEPHONE  | COMPGNES  |
| 12. CONTARCT 113. CONTRACT NUMBER 14. FLASH HIDEX NUMBER 18. START 16. CONTRACT NUMBER 18. STARTUS   | 3 RF TRANSMITTERS, 2 OSCILLATORS, AND CIRCUITRY 43. WEIGHT 49. VOLUME SG AVERGE POWER STANDBY POWER 52, PEAK POWER 33. MIRE |
| 3 TV   | 11 T.B 10 WATTS 10 WATTS  |
| 18. MONITOR 19. AGENCY 70. PGM OFFICE 21. TELEPHONE  | F MAGNETIC 56 NUCLEAR 57 THERMAL 58 SHIELDIN  |
| ROSENBERG, J. D. NASA HDQTRS OSSA/SCG 202-963-3361   | NONE NONE   |
|  | 59. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION  |
| 01/68 NA   | NONE REALTIME TELEMETRY CONTINUOUS  |
| The state of the s |   |
| DEALUN 3 RADIU-FREQUENCI IRANSHILLER   |   |
|  |   |
| 10SE   | 63. ADVANTAGES AND LIMITATIONS  |
|  |   |
| GRAVITATIONAL FIRLD. * * SECONDARY-TO DETERMINE MORE ACCURATELY  |   |
| E-1 1  |   |
| RELATIVE TO THE CENTER OF THE BASS OF THE EARTH.   | 1) NASA PRESS KIT FOR GEOS-18, RELEASE NO: 68-2K, JAN /, 58.***2)   |
|  | SYSTEMS, INC. REPORT NO. R-4035-45-2, OCT 1967.***3) PARAMETRIC   |
|  | ANALYSIS FOR PUTURE GEODETIC SPACECRAFT DEVELOPMENT. COMMUNICA  |
| THIS DOPPLER TRANSMITTER WAS PLOWN ON GEOS-1 AND ALSO HAS BEEN   | TION AND SYSTEMS, INC. REPORT NO. R-4035-50-2, JAN 1968.  |
| NAVY SATELLI   |   |
|  |   |
| SISTS OF 3 RADIO-FREQUENCY TRANSMITTERS OF ERATING AT 162, 325,  | ALSO PLOWN ON GEOS 1 AND NAVY SATELLITES. GEOS 2 = EXPLORER 36  |
| AND 9/2 THE CANADA TO STABLE OF THE OFFICE O | 66. DIAGRAMS  |
| MULTIPLITATE CHARGETTE TO PROVIDE TRANSMITTER PROGUESS.  |   |
| THE USE OF S COMPERNI MADIO PREGUENCIES, ENDERHIED BY THE MAIN   |   |
| THE CORPOLATION AND CORRECTION OF  |   |
| SPEEKLY REIGHTON BEIEL ON IDS DOFFLER FREQUENCY. THE DOFFLER SPEEKLY ON AUD CAMBITING MEASUREMENT OF ALTERTRANE AT 16.3 MET ALCOMET  |   |
| MILITER TO AT 325 MHZ AND 500 MILITER TO AT 972 MHZ. THE 162 AND   |   |
|  |   |
| ANSMITTER IS UNHODE  |   |
| HE HAIN POWER SUPPLY OF THE SPACECI  |   |
| CONTINUOUSLY.  |   |
|  |   |
|  |   |
| 32. PHENOMENA OBSERVED   |   |
|  |   |
| 33. MEASUREMENT RANGE  |   |
| 34 PBECISION AND ACCURACY  |   |
| יי דיברוניין דיני הייניין  |   |
|  |   |

| INSTRUMENT RESUME  | 35. SPECTRAL RANGE 35. SPECTRAL RESOLUTION. 37. TIME CONSTANT  |
|--|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER   | 38. FIELD OF VIEW 39. GROUND SWATH   |
| CAMBRIDGE, MASSACHUSETTS   | 80.0 DEG 900 NM DIAM CIRCLE PROM 600 NM ALTITUDE   |
|  | 40 ANGULAR RESOLUTION 41. SPATIAL RESOLUTION   |
| TECTOR   | NA   |
| (111LE CONT.)  | INTING ACCURACY 43, POINTING RATE 44, ALTITUDE 45, INCLINATION   |
| 6. PRINCIPAL INVESTIGATOR 17. ORGANIZATION B. TELEPHONE  | AS SPECIAL REQUIREMENTS  |
| . GODDARD SPACE PLT CENTER   |  |
| ATOR 10. ORGANIZA  | 1 !  |
| 1000   | LTIPLIER ASSEMBLY  |
| 12. UNITACE 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 18. SARE 18, DOLLE 19. CONTRACT NUMBER 115. ONTE  | T 49. VOLUME 52. PEAK POWER 51. STANDBY POWER 52. PEAK P   |
|  | 4 LB 0.1 CU PT 2 WATTS 2 WATTS   |
|  | D4. INTERFERENCE 33, INTERFERENCE 30, INTERFERENCE 31, INTERFERENCE 30, STIELDING  |
| 22. VENDOR 12. LOCATION 12. LOCATION 12. VENDOR 12. VENDOR 12. LEAD TIME   | 58. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION   |
| STON TECH. ASSOC. ROCKVILLE,   | DELAYED TELEMETRY  |
|  |  |
| 1, 4880-ANGSTROM CW-LASER PHOTO  | DATA IRLEMETERED VIA A 136.32-MHZ TRANSMITTER. BANDWIDTH NEEDED=   |
| ZS. APPLICATION  | 80 HZ*   |
| SOSE SOSE  | 63. ADVANTAGES AND LIMITATIONS   |
| -TO DETERMINE WHETHER LASER BEAM   |  |
|  |  |
|  |  |
| SCINTILLATION OF THE LASER BEAM AS VIRWED PROM THE SATELLITE.  | 1) NASA PRESS KIT FOR GEOS-B. RELEASE NO: 68-2K, JAN 7, 68. ***2)  |
|  | PARAMETRIC ANALYSIS FOR FUTURE GEODETIC SPACECRAFT DEVELOPMENT.  |
| 31. PRINCIPLES OF OPERATION  | REPORT NO. REQUISSABLE OF COMMONICATIONS AND SYSTEMS, INC. JAN 98.   |
| TO TOTAL STREET OF GRANDE OF CASE  | FOR THE GROV-B SPACECRAFI. REFORT NO.  |
| ADDON TAKED DEFECTOR MAN DENIGNED TO DEFECT NOUGHTION OF AN  | PECSONS, CORRENTERIZED AND DISTRICE TROP OCT. OCT. OF THIS DESIGN AND DESCRIPENTED OF THIS DESCRIPENTED TRANSPORTED TRANSPORTE |
| A 0.6 TN (1.5  |  |
| - 72   | GEOS 2 IS ALSO KNOWN AS EXPLORER 36.   |
| (5.6 CM) POCAL LENGTH, P/0.78 OBJECTIVE COLLINATE THE LIGHT SO   | 66. DIAGRAMS   |
| BEAM STRIKES A WAVELENGTH FILTE  |  |
| IN DIAMET  |  |
| TRANSMISSION OF SO PERCENT AT 4890 A AND A HALF-DOWER BANDWIDTH  |  |
| OF 46 A. TRANSMISSION OUTSIDE THIS PASSBAND IS LESS THAN 0.0063  |  |
| PER CENT PROM 2500 TO 20000 A. APTER THE PILTER, ANOTHER SET OF  |  |
|  |  |
| (2.54 CM)  |  |
|  |  |
| ы  |  |
| FILTER MITH A TOU NEW DAYS OF THE STATES AT 13 ANG. THUS THE STATES AT STATES OF THE STATES AT A DESCRIPTION OF THE STATES A |  |
| DELECTOR IS SECRETIVE OWLY TO DESCRIPTION IN TRECUENCY OF DESCRIPTION OF DESCRIPTION OF DE DOCUMENTATION   |  |
| 1 2  |  |
| THE SIGNAL RANGE OF 1000 INTO A -5 TO +5 V RANGE FOR TELEMETRY.  |  |
|  |  |
| 00000  |  |
| 33. MEASUREMENT RANGE  |  |
| 0.1 TO 100 PICOMATT  |  |
| 34. PRECISION AND ACCURACY   |  |
|  |  |
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| INSTRUMENT RESUME  | 36. SPECTRAL RANGE 21. TIME CONSTANT OF 11.5 THE CONSTANT OF 11.5 THO O T MICRON IN N  |
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| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBINIOGE, MASSACHUSETTS  | EW 39. C   |
| 1, TITLE 2. ACRONYM 3. EXP NO  | RESOLUTION AT SPATIAL RESOLUTION   |
|  | M 600 NM ALTITUDE  |
|  | 145. INCLINATION   |
| 10014451440000   | NED ECCENTRIC, HIGH RETROGRADE   |
| DI CANTAL INVESTIGATION CONTRACTOR OF CONTRA | 46. SPECIAL REGUIREMENTS   |
| 10. ORGANIZATION   | 47. COMPONENTS   |
|  | S  |
| 12 CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STAFF 16. CONTRACT 17. STATUS   | VOLUME SO. AVERAGE POWER STANDBY POWER   |
|  | _  |
| 19. AGENCY 20. PGM OFFICE  | SPERENCE 'SS' ANTERPERENCE   |
| 22. VENDOR DA (MASA HUUTKS   OSSA/SCG  202-963-3361  | NONE NONE I NONE I SECONDENT SECONDE |
| CE TECHNOLOGY CTR VALLEY PORGE, PA   | NONE   |
|  | EMETRY REQUIREMENTS  |
| REFLECTOR, 400 1-INCH CUBICAL SILVERED-PRISH   | NONE   |
| LICATION   |  |
| UKUU<br>30. PURPOSE  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY-TO MAKE ACCURATE BANGE AND ANGLE MEASUREMENTS TO THE   |  |
|  |  |
|  |  |
| MEASUREMENTS OF CONTINENTAL DRIPT AND THE TIDAL MOVEMENT OF LAND   | ISE NO:68-2K, JAN 7, 68.   |
| n Bubbbs   | PLAN OF OPERATIONS FOR THE GEOS-B SPACECRAFT. REPORT NO. R-4035-45-2. COMMUNICATIONS AND SYSTEMS. INC., OCT 57.***3) PARAMETRIC  |
| 31. PRINCIPLES OF OPERATION  | RODETIC SPACECRAFT   |
| THIS IS AN ABBAY OF QUARTZ CUBIC CORNER REFLECTORS HOUNTED ON 4  | COMMUNICATIONS AND SYSTEMS INC, JAN 68.  |
| OF THE 8 PLAT PANELS ON THE BOTTOM SURPACE OF THE SPACECRAFT.  |  |
| EACH REFLECTOR IS A PUSED QUARTZ PRISH ABOUT ONE INCH IN SIZE  |  |
|  | ALSO PLOWN ON EXPLORERS 22, 27, AND 29, GEOS 2 = EXPLORER 36.  |
|  | 06. DIAGHAMS   |
| 300 SQUARE INCHES. THE FRINGS ARE COINED TO AN ACCURACY OF S   |  |
| DEPARTMENT STREETS A DO ENGLOST COMP. SHE REPROSESTED AND ENGLES   |  |
| H  |  |
| N THE  |  |
|  |  |
| BREEGY SHORT-DURATION PULSES FIRED BY THE GROUND LOCATED LASER   |  |
| TRACKING SISTEMS, THE REFLECTED LIGHT IS FICKED UP BY A TELE-  |  |
| TIME OF THE LIGHT PUISES. THIS GIVES THE DISTANCE TO THE SATEL-  |  |
| SATELLITE OPTI   |  |
| G THE B  |  |
| FIELD YIELDS ANGULAR POSITION.   |  |
| 33. PHENOWENA OBSERVED   |  |
| HIGH-ENERGY SHORT-DURATION LASER PULSES PROM GROUND STATIONS   |  |
| 33. MEASUREMENT RANGE  |  |
| 34. PRECISION AND ACCURACY   |  |
| RANGE NEASUREHENT TO 1.5 HETERS: RANGE-RATE TO ABOUT 1 CHASEC  |  |
|  |  |

| _        | 64. REFERENCES   |   |
|----------|--|---|
| ONI      | 1) NASA PRESS KIT FOR GEOS-B. RELEASE NO:68-2K, JAN 7, 68.***2)  |   |
|          | 45-2. COMMUNICATIONS AND SYSTEMS, INC., OCT 67. ***3) PARAMETRIC |   |
|          |  |   |
| <b>=</b> | R-4035-50-2, COMMUNICATIONS AND SYSTEMS INC, JAN 68.             |   |
|          | 65. HISTORICAL REMARKS   |   |
|          | ALSO FLOWN ON EXPLORERS 22, 27, AND 29, GEOS 2 = EXPLORER 36.    |   |
|          | 00, 00, 00, 00, 00, 00, 00, 00, 00, 00,                          |   |
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|  | INSTRUMENT RESUME  | SPECTRAL RANGE  |
|--|--|---|
| NAT  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FLECTRONICS RESEARCH CENTER  | 33. FIELD OF VIEW 39. GROUND SWATH  |
|  | CAMBRIDGE, MASSACHUSETTS   | NA NA   |
| TITLE  | 2.ACBONYM 3. EXP NO  | JOULAR RESOLUTION 41, SPATIAL RESOL   |
| PTICAL BEACON  | OBEAC<br>A. PESUME S. VERSION  | NA NA A SE 44. ALTITUDE 145. INCLINATION                                    |
|  | 11/10/69   | NA MED ECCENTRIC: HIGH RETROGRADE   |
| ERBERT. J. H.  | GODDARD SPACE PLT CENTER   | 46. STECIAL MEDUITEMENTS  |
| CO-INVESTIGATOR  | 10. ORGANIZATION 11. TELEPHONE   | ΙI  |
| CONTRACT 13. CONTRACT NUMBER   | MBER 14. FLASH INDEX NUMBER 18. STATUS   | FOUR FLASH TUBES, BATTERY   |
| П  | 3  | 8 WATTS 720 WATTS   |
| MONITOR  | 20. PGM OFFICE 21. TELEPHO   | 54. INTERFRENCE SS. INTERFRENCE SG. INTERFRENCE TO INTERFRENCE TO SHIELDING |
| OSENBERG, J. D.  | NASA HDOTRS OSSA/SCG 202-963-3361  | NONE NONE NONE SECURE NONE SALVER SECURENCY OF CHRENCATION                  |
| G. AND G. INC.   | MASS 01/68 NA  | NA  |
| INSTRUMENT TYPE  |  | 62. TELEMETRY REQUIREMENTS  |
| S. APPLICATION   | ايسا   | NON E   |
| BOD  | G20S 2   | 63. ADVANTAGES AND LIMITATIONS  |
| RIKARY-TO OBTAIN GEOMETRIC TRIANGULA   |  |   |
| RASURERENTS.   | ACE. * * * * SECONDARI - TO OBIAIN PRECISE ANGLE   | 64. HEFERENCES  |
|  |  | 1) NASA PRESS KIT FOR GEOS-B. RELEASE NO: 68-2K, JAN 7, 68.***2)            |
|  |  | AND SYSTEMS   |
| HE OPTICAL BEACONS ARE USED IN CONJU   | ARE USED IN CONJUNCTION WITH A LARGE NUMBER  |   |
| OF GROUND-BASED CAMERA SYSTEMS WHICH   | IERA SYSTEMS WHICH SIMULTANEOUSLY PHOTOGRAPH   | 65. HISTORICAL REMARKS  |
| ne beacons against a siam bachdroum<br>Hists of a identical Helically-Wodno  | F  | GEOS 2 IS ALSO KNOWN AS EXPLORER 36.  |
| ENON GAS. MAXIMUM LIGHT LEVELS AT  | כים  |   |
| HE SATELLITE IS SEEN BETHEEN 35<br>HIS REACON SYSTEM WITH & LANDS 1  | BATELLITE IS SEEN BETWEEN 35 AND 55 DEG ELEVATION ANGLE.   |   |
| BLE FOR OPERATIONAL ALTITUDES UP TO  | ż  |   |
| S 1580 CANDLE-SECONDS FOR EACH FLAS:<br>ANDLE-SECS FOR ALL 4 TUBES FLASHING  | S 1580 CANDLE-SECONDS FOR EACH FLASH TUBE OR APPROXIMATELY 6300<br>ANDLE-SECS FOR ALL 4 TUBES PLASHING SIMULTANEOUSLY. THE NOMI- |   |
| IAL PLASH DURATION IS 1 MILLISECOND OTHER TOTTERS  | IS 1 MILLISECOND BETWEEN 30% INTENSITY NP DOMPR. RETHERN 610 AND 950 INDIVIDIAL LAMP   |   |
| LASHES PER DAY ARE AVAILABLE. THE  | ENERGY USED  |   |
| 'LASH IS /20 WATT-SEC. EACH FLASH TU<br>LASH INTENSITY OF AT LEAST 50% OF IT   | SEC. EACH FLASH TUBE IS EXPECTED TO HAVE A<br>AT LEAST 50% OF ITS INITIAL VALUE AFTER  |   |
| .0,000 PLASHES. THE PROGRAMMED   | IE PROGRAMMED FLASH TIMES AND NUMBER OF TUBES MINECUED INFO THE SATELITY MENORY BY THE   |   |
| OSHAN GROUND STATI   | INE SAIELLIE NENORI,<br>Y BASIS.   |   |
|  |  |   |
| A THE COME TO THE CONTRACTOR   |  |   |
| . MEASUREMENT RANGE  |  |   |
| NOV CONTRACTOR CONTRAC |  |   |
| , Phecision and accorder   |  |   |
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|  | The second secon |
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| INSTRUMENT RESUME  | 36. SPECTRAL RANGE   |
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  |  |
| ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 28. FIELD OF VIEW 39. G  |
| 1. TITLE   | 48. ANGULAR RESOLUTION 41, SPATIAL RESOLUTI  |
| SATELLITE RANGE AND RANGE-RATE EXPERIMENT  | NA.  |
|  | 42, POINTING ACCURACY 43, POINTING RATE  |
|  | NA NA  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL REQUIREMENTS   |
| BERBERT, J. H. GODDARD SPACE FLT CENTER 301-982-5055   | 27 COMPONENTS  |
|  | TO SUCCESSION OF THE SUCCESSIO |
| 12 CONTRACT 13 CONTRACT NUMBER 14 FLASH INDEX NUMBER 15 START 16 CONTRACT 17 STATUS                          | 46. WEIGHT 49. VOLUME 50.  |
|  | 9.22   |
| 19, AGENCY   | 54. INTERFERENCE 55. INTERFERENCE 56. INTERF   |
| ROSENBERG, J. D. INASA HOOTRS OSSA/SCG 202-963-3361  | SOURC/SEN  |
| D SPACE FLT CENTER GREENBELT, MD. 01/68 NA   | NONE   |
|  | > l  |
| TRANSPONDER, S-BAND 2271 MHZ (RECEIVE) AND 1705 MHZ (XMIT) UNC 28 APPLICATION                                | SEE ITEM 31  |
| GROD GROS 2  | SINCITATION LOUN SECUNDATION CO.   |
| TOTAL MAN AND HOLD BASE MAN AND CHARLES HER CARDITIES HO SHAKENING AND                                       |  |
| PRIMARY-TO BE USED FOR TRACKING THE SATELLITE TO AUGRENT GEO-  | LOWER THAN SECOR.  |
| AND THE OTHER GEODETIC MEASUREMENT INSTRUMENTS ON BOARD.   | 64. REFERENCES   |
|  | 1) NASA PRESS KIT FOR GEOS   |
|  | COMMUNICATIONS AND SYSTEM  |
| 31. PRINCIPLES OF OPERATION  | ***3) PLANNED OPERATIONS F   |
|  | TIONS AND SYSTEMS, INC, R  |
| CHANGE OF SCANI HANGE OF THE SPACECRAFT. THE MANGE IS USIALNED OF MANGE OF THE MANGE TO SOOM HER             | 65 HISTORICAL REMARKS  |
| DI MENGONING INE MASSE SHILL OF A MAYE LUMPELLING INCH LINE CROSSED TO THE SATELLINE AND BACK. PANCE PARE IS | ALSO PLOWN ON GROS 1. GEO  |
| ~  |  |
| ULATION PREQUENCIES. THE TRANSPONDER RECEIVES SIMULTANEOUS SIG-  |  |
| NAIS PROM ONE TO THREE GROUND STATIONS AT 22/1 MHZ, MODULATED BY   |  |
| THE MANGING SIDETONES. THE TRANSFONDER TRANSLATES THESE SIGNALS  |  |
| THE CORRESPONDE OF THE RANGE TONE MODULATION. THE CORRESPONDING  | <del></del>  |
| PRESERVED BY USING THE SAME OFFSET OSCILLATOR AS A SOURCE FOR  |  |
| 3 DOWN-CARRIER, AND AS A HETERODYNE  |  |
| HE UP-CARRIER. NO DEMODULATION OF THE  |  |
| TAKES PLACE WITH THE UP-CARAIER. THE POWER SUPPLY UNIT IS  |  |
| DOMEN TO BACH TRANSPONDER FOR APPROXIMATELY 60 MINGHES DER DAY.  |  |
| ON COMBAND.  |  |
|  |  |
| 32, PHENOMENA OBSERVED   |  |
| 2271 MHZ (S-BAND) RADIO TRANSMISSIONS FROM GROUND STATIONS   |  |
|  |  |
| 34. PRECISION AND ACCURACY   |  |
| ACCURACY OF RANGE MEASUREMENT IS APPROXIMATELY 10 NETERS   |  |
|  |  |

| 1        | The second control of  | ATTENDED TO THE PERSON OF THE  |
|----------|--|--|
|          | SEE ITEM 31  | NA NAME OF STREET OF STREE |
|          | LD OF VIE  | 39. GROUND SWATH   |
| <u></u>  | 40 ANGULAR BESOLUTION 41 SPATIAL RESC  | BESOLUTION<br>BESOLUTION   |
| 1        | 2  |  |
| NO.      | 42. POINTING ACCURACY 43. POINTING RATE  | 44. ALTITUDE   |
| <u>~</u> | NA NA NA NA NA 46. SPECIAL REQUIREMENTS  | NED ECCENTRIC HIGH RETROGRADE  |
| T        |  |  |
|          | 47. COMPONENTS   |  |
|          | TRANSPONDER  | 50. AVERAGE POWER 51. STANDBY POWER 52. PEAK POWER 53. MTRE  |
| -        | A +  | 2 HAPTER 25  |
| 4        | 55. INTERFERENCE   | E 58. SHIELDING  |
|          | SOURC/SEN  | AN DATA RECOVERY AT ERFOLIENCY OF ORSERVATION  |
| 7        | P.N.O.N  | LEMETRY  |
|          | EMETRY   |  |
| <u>U</u> | SEE ITEM 31  |  |
| П        |  |  |
| Т        | VIAGES AND LIMITATIONS   |  |
|          | RANGE SIGNAL MARGIN (27  | 7 DB AT 900 NM SLANT RANGE) IS SLIGHTLY  |
|          | RENCES   |  |
|          | ESS KIT POR  | GEOS-B. RELEASE NO: 68-2K, JAN 7, 68.***2)   |
|          | PARAMETRIC ANALYSIS FOR  | PUTURE GEODETIC  |
| -        | COMMUNICATIONS AND SYS   | MES, INC, REPORT NO. R-4035-50-2, JAN  |
| T.       | ###3) PLANNED OPERATIONS<br>#1008 AND SVS#FMS TNC  | S FOR THE GEOS-B SPACECRAFT. COMMUNICA-<br>REDORT NO. R-4035-45-2 OCT 1967   |
|          | Company of the compan |  |
|          | MARKS  |  |
|          | ALSO FLOWN ON GEOS 1.  | GEOS 2 IS ALSO KNOWN AS EXPLORER 36.   |
|          | 0.00   |  |
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| INSTRUMENT RESUME  | RANGE  |
|--|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FI ECTANNICS RESEARCH CENTER   | SEE ITEM 31 33 GROWN WATH  |
| CAMBRIDGE, MASSACHUSETTS   | NA NA  |
|  | IGULAR RESOLUTION  |
| SEQUENTIAL COLLATION OF RANGE SYSTEM   | 20 SOUNTING ACCUBACY AS DOINTING DATE 44 ALTITINE AS INCLINATION   |
| 0ATE   | 100 E 20 E   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | PECIAL REQUIREMENTS  |
| MCCALL, J. CORPS OF BNGINBERS  |  |
| 9, CO-INVESTIGATOR 10, ORGANIZATION 11, TELEPHONE  | 47. COMPONENTS   |
| 10713  | RANSPONDER   |
| 12. CYTYPE 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 16. CONTRACT NUMBER 15. DATE  | 1 49. VOLUME 50. AVERAGE POWER 51, STAND   |
| 46   | 11 LB 30 HATT 30 HATTS   |
| TO AGENCY TO SEE OF THE CONTROL OF T | 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE   |
| ROSENBERG, J. D. INASA HUGIRS   DSSA/SCG  202-963-3351   | SOUNC/SEN   SOURC/SEN   SOURCE   SOURCE |
| CORPORATION SAN DIEGO, CAL 01/68 NA  | REALTIME TELEMETRY   |
|  | EMETRY REQUIREMENTS  |
| TRANSPONDER, RANGING   | SEE ITEM 31  |
| LICATION   |  |
| GEOD GROS 2  |  |
|  | S AND LIMITATIONS  |
| PRIMARY-TO DETERMINE POSITIONS BY GEOMETRIC MEANS IN A STEP BY   | LOCATION ERRORS ARE ADDITIVE AS GROUND STATIONS MOVE.  |
| ,  | 64. REFERENCES   |
|  | 1) NACA DEBOG KIT BOD CEOCH B DETENCE NO. 60-25 IAN 7 60 4440  |
|  | SPACECRAPT DEVE  |
|  | COMMUNICATIONS AND SYSTEMS, INC, REPORT NO. R-4035-50-2, JAN 68  |
| 111  | ***3) PLAN OF OPERATIONS FOR THE GEOS-B SPACECRAFT. COMMUNI  |
| 4  | TIONS AND SYSTEMS, INC, REPORT NO. R-4035-45-2, OCT 1967.  |
| 80   |  |
| Ħ  | 65. HISTORICAL REMARKS   |
| IN TURN POR RANGING TO THE SPACECRAFT TRANSPONDER. RANGE MEA-  | GROS 2 IS ALSO KNOWN AS EXPLORER 36.   |
| SUREMENTS ARE MADE BY MEASURING THE PHASE SHIPT OF THE RANGING   | 65. DIACHAMS   |
| SIDETONES WHICH MODILATE THE CW CARRIER BY HISTNG GEOMETRIC  |  |
| TECHNICIES THE INKNOWN DOSTITION OF 1 OF STATIONS OF STATIONS  |  |
| CIPATULY DETERMINED A CEDITICS OF CATAFORD CATAFORD OF THE PROPERTY OF THE PRO |  |
| DITARBUTA SO MILIEVED + THESE SE   |  |
| ND. IN   |  |
| TRANSPONDER RECEIVES AN INTERROGATING SIGNAL (421 MHZ), REMOVES  |  |
| IE CARRIER AND LOCALLY   |  |
| ATES TWO COHERENT REPLY CARRIERS, MODULATING ONE (449 MHZ) WITH  |  |
| OTHER (224.5   |  |
| ONLY THE 585.533 KHZ RANGING FREQUENCY. THE SECOND CARRIER   |  |
| A CORRECTION TO BE MADE FOR IONOSPHERIC  |  |
|  |  |
| WITH THE SRARR AND C-BAND TRANSPONDERS.  |  |
|  |  |
| 22 PHENOMENA DESERVED  |  |
| POD THE CHARACTER AND MODEL  |  |
| 33. MEASUREMENT RANGE  |  |
|  |  |
| 34. PRECISION AND ACCURACY   |  |
| ACCURACY OF RANGE NEASUREMENT IS APPROXIMATELY 10 METERS   |  |
|  |  |

| INSTRUMENT RESUME  | 38. SPECTRAL RANGE 39. TIME CONSTANT   |
|--|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  | TO 13. KEV NA  |
| ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 38. FIELD OF VIEW 38. GROUND SWATH   |
| 1. TITLE 2. ACRONYM 3. EXPINO  | AR RESOLUTION 41. SPATIAL RESOL  |
| IENCE ELECTRON PLUX EXPERIMENT SSEPE   | 33. DEG NA   |
|  | ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION  |
| 1 OBOATACHANGE   | MED ECCENTRIC HIGH RFTROGRAD   |
| ROSTROB. C.O. APL-JOHNS HOPKINS DNIV 301-776-7100  | 46. SPECIAL MEDUNEMENTS  |
| 10. ORGANIZATION   | 47. COMPONENTS   |
| 19 CONTRACT 13 CONTRACT NIMBER (4 81 ACH INDEX NIMBER 16 START (4 CONTRITON) 2 CTATLO  | A WEIGHT OF THE FOR ANGENERAL STREET ON THE STREET OF THE  |
| DATE   | TO VICTOR TO VIC |
| 20. PGM OFFICE 21. TELEPHO   | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING  |
| PRG, J. D. NAS   | SENSITIVE SENSITIVE  |
| 23. LOCATION   |  |
| APL-JOHNS HOPKINS UNIV SILVER SPRING, AD, 01/68 NA 22. INSTRUMENT TYPE   | 62 TELEMETRY REQUIREMENTS  |
| CTRON MULTIPLIER PARTICLE; X-AXIS MAGNETOMETER   |  |
| 28 SPREICHTION, TO SPREICHTION |  |
|  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY-TO MEASURE THE PLUX OF PRECIPITATING ELECTRONS IN THE  | ELECTRON SHEATH NEAR SPACECRAPT INTERFERES WITH EXP.   |
| KARTH'S ATROSPHERE.  | אַ מוּהַבּמּאַרָאַרָּאַ  |
|  | 1) NASA PRESS KIT FOR GEOS-B. RELEASE NO: 68-2K, JAN 7, 68, ***2)  |
|  | TIONS FOR THE GEOS-B SPACECRAFT. REPORT NO   |
| 31. PRINCIPLES OF OPERATION  | 43-2. COMMUNICATIONS AND SISTEMS, INC., OCT. 1987.   |
| THE SOLAR SCIENCE BLECTRON DETECTOR (SSED) IS AN INSTRUMENT TO   |  |
| POCUSING TO DEFINE THE ENERGY INTERVAL AND AN ELECTRON MULTIPLIT   | 65. HISTORICAL REMARKS   |
| ER (BENDIX CHANNELTRON) AS A PARTICLE DETECTOR. THE MAGNETIC   | GEOS 2 IS ALSO KNOWN AS EXPLORER 36.   |
| PHENOMENA ARE HEASURED WITH THE K-AXIS MAGNETONETER. THE OUTPUT  | ieb. DIAGRAMS  |
| AS FILIERED AND ARELITED BY A FACTOR OF 100. THE HALF-POWER POINTS ON THE FILTER ARE AT 0.03 HZ AND 3 HZ. AFTER ARPLIFICA-   |  |
|  |  |
| SENSITIVITY OF 5 GARRA. THE PARTICLE AND RAGNETORETER DATA ARE SIRCOMMINATION STRUTH THE SCEN DACKAGE SO THAT ONLY ONE CHANNET   |  |
| 1 (0   |  |
| PLED ALTERNATELY AS PROGRAMMED. PARTICLE DATA ARE OBTAINED ONLY ON PASSES WITHIN VIEW OF THE APL COMMAND STATION. SINCE THE  |  |
| SPACECRAFT IS STABILIZED TO WITHIN ABOUT 20 DEG OF ZENITH AND  |  |
| THE INSTRUCTOR COLLINATOR ADMITS ONLY PARTICLES WITHIN ABOUT 13 DEG OF THE AXIS, PARTICLES WITH LOCAL PITCH ANGLES BETWEEN 0 AND   |  |
| 33 DEG WILL BE SAMPLED.  |  |
|  |  |
|  |  |
| PRECIPITATING ELECTRONS WITH LOCAL PITCH ANGLES FROM 0 TO 33 DEG 33 MEASUREMENT HANGE  |  |
| FLUX FROM 10 THOUSAND TO 10 BILLION ELECTRONS/SEC/SQ CM/STER   |  |
| MAGNETIC PRENOMENA TO PLUS OR MINUS 5 GAMMA  |  |
|  |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBINISTRATION CAMBINISTRATION  | TO 30.0 MJCRON 30. SPECTRAL RESOLUTION 37. TIME CONST   |
|--|---|
| 1. TITLE ZACRONYM 3. EXP NO  | SEE ITEM 31 ILINB-TO-LIMB (3500 NM) FROM 500 NM ALT ARANGOLAR RESOLUTION ALT AGANGOLAR RESOLUTION ALT |
| H  |   |
| (TITLE CONT.) 4. HEBUME 5. VERSION 1.1 / JA / A / A / A / A / A / A / A / A /  | 43. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION NEW CITEMATER 5. INCLINATION     |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | nonte-noc   nonto   |
| R.J. UNIVERSITY OF WISCONSIN   | CATALIVATION  |
| TO CHEANIZATION  | 4. SPNSONENTS 4. SPNSONES (THERMISTORS). BLECTRONICS  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 18. START 18. CONTRACT NUMBER 19. STATUS   | 48. WEIGHT 48. VOLUME 50. AVERAGE POWER 81, STANDSY FOWER 52. PEAK POWER 53. MTBF                     |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 54. INTEREGREENCE 55. INTEREGREENCE 56. INTEREGREENCE 58. SHIELDING                                   |
| MASA HDOTRS  | SENSITIVE SENSITIVE POR THERMALLY ISOLATED  |
| P WISCONSIN HADISON, WISCONSIN NA  | DELAYED TELEMETRY   |
| 26 INSTRUMENT TYPE 26 INSTRUMENT TYPE DA STOMBORD TO UTCIDIO TO GLOBOLICATION THE DESIGNATION OF THE DESIGNA | 0 8444  |
| 1 DEAULS I DE BOLORDI EN   | 15 BPS DA   |
| NET ITOS A   | 8. SEC. DATA SAMPLING CYCLE TAKES 32 SEC.   |
| -TO GATHER DATA TO AID IN DETE   |   |
| BADIATED FROM THE EARTH AND THE RELAT  | A DECEMBENCES   |
| DELY OF INTO END CONTROL TO INCOLLEG ENDING FROM IND SOU AND (2) THE PRESENT OF COLLEG REDIEFTON BY THE RAPTH-   | 1) DESTRU STIDY REPORT FOR THE IMPROVED TOSTITOS! SYSTEM, V.1.2.                                      |
| ATHOSPHERE SYSTEM.   | INE 7, 1  |
| 31 PRINCIPLES OF OPERATION   | 2) RUBIN, L.: OPERATIONAL PROCESSING OF LOW RESOLUTION IR (LRIR)                                      |
| AN IDENTICAL PLAT PLATE RADIOMETER (PPR), WILL ALSO BE PLOWN   | בספט ובכט עודנטען מחסכ שלי ומתי   |
|  |   |
| $\overline{}$  | 1   |
| WHICH IS SENSED BY THERMISTORS MODNIED ON THE BACK SURFACE, THE HOUSTING TEMPERATURES ARE SEPARATELY SENSED AND RECORDED. THERE  | THIS FPR IS SIMILAR TO THE LRIR FLOWN ON ESSA 3, 5, 7, AND 9, s. DIAGRAMS                             |
| ONE DISK OF EACH PAIR IS PAINTED   |   |
| SLACK PAINTED SURFACE  |   |
| DESPOND TO THE SUM OF THE MEFLECTED SOLAR, LIKELI SOLAR, AND RE-   |   |
| DISKS REFLECT IN THE VISIBLE RANGE BUT ARE BLACK TO IR BEYOND 7  |   |
| MICHONS. THESE ABSORB THE RERADIATED ENERGY FROM THE EARTH   |   |
| AND EXCLUDE TO A MIGH DEGREE THE DIRECT AND REFLECTED SOLAR DAINTATION ONE BLACK WHITE DAIR WILL OPERATE AS RADIATIVE  |   |
|  |   |
| RGY REQUIRED 1   |   |
| CONSTANT TEMPERATURE WILL BE REASURED. THE SET OF 4 RADIOMETERS  |   |
| IS 180 DEGR  |   |
| AS BURNALEMA ABREBUEN  |   |
| ENERGY RADIATED PROM AND REFLECTED BY THE EARTH'S ATHOSPHERE   |   |
| 33. MEASUREMENT AANGE  |   |
| 34, PRECISION AND ACCURACY   |   |
|  |   |

I TOS B

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESERRCH CENTER  | 38. SPECTRAL RANGE  39. SPECTRAL RESOLUTION 37, TIME CONSTANT  39. FIELDOF VIEW  39. GROUND SWATH |
|--|---|
| CAMBRIDGE, MASSACHUSETTS   | SRE ITEM 31 LIMB-TO-LIMB (3500 NM) PROM 500 NM ALT  |
| PELATE RADIOMETER PDR  | 40.ANGULAR RESOLUTION41, SPATIAL RESOLUTION   |
| ,  | 42. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION                              |
| 11012461144000 #   | MED CIRCULAR SUN-SYNCH RETROGRADE   |
| PARRIAT DR. R. J. INTVERSITY OF STECONSTN 608-262-38   | 40, STECIAL HELIUI HEMEN 3  |
| 10. ORGANIZATION   | 47, COMPONENTS  |
|  | SENSORS (THERMISTORS), ELECTRONICS  |
| 12, CONTRACT NUMBER 14, FLASH INDEX NUMBER 15, DATE 16, DATE 17, DATE 17, MODET  | 48. WEIGHT AS VOLUME 50. AVERAGE POWER 51. STANDSY FOWER 52. PEAK POWER 53. MTBF                  |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE   | 54 INTERFERENCE 55 INTERFERENCE 56 INTERFERENCE 57 INTERFERENCE 58 SHIELDING                      |
| Z. M.L. NASA HDOTRS OSSA/SRO   | FPR T   |
| 122 VENDOR TATE OF STACONSTW MADISON STACONSTW   | 159. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION UT PU OF HOLISTING                |
|  | ENTS  |
| A IR/VISIBLE LOW-RESOLUTION TR   | STITUTE ONE PPR PRAME OF DATA, 8 BITS TO T  |
| 28. APPLICATION  | THE FRAME IS READ OUT SERIALLY AT 15 BPS DATA READOUT TAKING                                      |
| 1 1 U.S.   | TAGES AND LIMITATIONS   |
| TO AID IN DETER  |   |
| COID OF SHIE CONDECT AND THOUSEN THE EARTH AND THE RELATION-   | A4 DEERDINGES   |
| COLF OF TOLS EMBED IN TROODING INCOLURE SHEET PROFILE SHEET STORE TO SHEET SHE | THE METSAS (SOUTH SOUTH CONTROL AND COME ACTIONS  |
| 9  | RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUNE 7, 1968.**                                    |
|  | ERATIONAL PROCESSING OF LOW RESOLUTION I  |
|  | DATA PROM ESSA SATELLITES. ESSA TECH BEPORT NESC-42, PEB. 1968.                                   |
| AN IDENTICAL PLATE RADIOMETER (PPR), WILL ALSO BE PLOWN ON THOS & AND C AND USE PIOUN ON WIDOS W THUS DELICITED I DARM   |   |
| IIOS A AND C AND DAS FLOWN ON IIROS D. THE<br>BACH RADIOMETER IS A THIN ALUMINUM DISK, THE   | 65. HISTORICAL REMARKS  |
| 0  | THIS PPR IS SIMILAR TO THE LRIR FLOWN ON ESSA 3, 5, 7, AND 9                                      |
|  |   |
| ARE 2 PAIRS OF SENSORS. ONE DISK OF EACH PAIR IS PAINTED BLACK   |   |
| AND ONE IS ANODIZED ALUMINUM. THE BLACK PAINTED SURFACE WILL   |   |
| Ξ.   |   |
| HADIATED LONG-WAVE HADIATION. THE ANODICED ALUMINUM (WHITE)  |   |
| MICRONS, THESE ABSORD THE REPAIRED FORERTY PROM THE PARTH  |   |
| E TO A HIGH DEGREE THE DIREC   |   |
| ONE BLACK/WHITE PAIR WILL OPERATE AS RADIATIVE   |   |
| EQUILIBBIUM DETECTORS, SIMILAR TO ESSA. THE 2ND PAIR IS OF A NEW THERMAL PERDBACK DESIGN. THE ENERGY RECHTED TO MAINTAIN A   |   |
| IPERATORE WILL BE  |   |
| ဌ  |   |
| NADIR. THE PIELD OF VIEW IS 180 DECREES POR ALL FOUR SENSORS.  |   |
| 23. BUENOMENA ABREBUEN   |   |
| TEXESCA DADIATED PROOF AND REPLECTED BY THE PARTHIC ATHORDER   |   |
| 1 1  |   |
|  |   |
| 34, PRECISION AND ACCURACY   |   |
|  |   |

| INSTRUMENT RESUME   |   |
|---|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION 13  | 38. FIRE DOE VIEW 39.0 MICRON 39. FIRE DOE VIEW                                   |
| CAMBRIDGE, MASSACHUSETTS  | SEE ITEM 31 LINB-TO-LINB (3500 NM) FROM 500 NM ALT                                |
|   | 40.ANGULAR RESOLUTION41, SPATIAL RESOLUTION                                       |
| PLAT-PLATE RADIOMETER (FPR (TITLE CONT.)  | 42. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION              |
| 11/10/69 0006   | MED CIRCULAR  |
| UNIVERSITY OF HISCONSIN   | 40. STEURE RELUINEMENTS   |
| O CHGANIZATION  | SENSORS (THERMISTORS), ELECTRONICS  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATE 16. CONTRITION 17. STATUS                                   | 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDBY POWER 52. PEAK POWER 53. MTBF |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE   | 54. INTERFERCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING   |
| GARBACZ, B. L. NASA HDOTRS OSSA/SRO 202-963-4291  | SO CALIBEATION AS DATA BEFORE SENSITIVE PPR THERMALIY ISOLATED                    |
| SITY OF WISCONSIN MADISON, WISCONSIN  | DELAYED TELEMETRY   |
| IR/VISIBLE LOW-RESOLUTION THERMISTOR BOLONETER  | E ONE PPR FRAME OF  |
| 29, SPACECHAFT  |   |
| 30. PURPOSE   | DATA SARELING CICLE TAKES TAGES AND LIMITATIONS                                   |
| PRIMARY-TO GATHER DATA TO AID IN DETERMINING: (1) THE GEOGRAPHIC  |   |
| INCOMING ENERGY   | 64. REFERENCES  |
| D SCATTERING OF SOLAR RADIATION BY THE EARTH-   | 1) DESIGN STUDY REPORT FOR THE IMPROVED TOS (ITOS) SYSTEM, V.1,2.                 |
| AIROSPHERE SISIER.  | BUR ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUNE /, 1968.***                   |
| 31. PRINCIPLES OF OPERATION   |   |
| P.R.)   |   |
| ON LICER AND D AND DAS FLOWN ON LINCS OF THE PRINTING OF RACH PROPERTURE OF   | 65. MISTORICAL REMARKS  |
| WHICH IS SENSED BY THERMISTORS MOUNTED ON THE BACK SURFACE. THE   | THIS PPR IS SIMILAR TO THE LRIR FLOWN ON ESSA 3, 5, 7, AND 9,                     |
| HOUSING TEMPERATURES ARE SEPARATELY SENSED AND RECORDED. THERE  | 66. DIAGRAMS  |
| ARE 2 PAIRS OF SENSORS. ONE DISK OF EACH PAIR IS PAINTED BLACK AND ONE TO ANONTON ATOMINIM THE BLACK DAINTED CHERACO DITE     |   |
| RESPOND TO THE SUM OF THE REFLECTED SOLAR, DIRECT SOLAR, AND RE-  |   |
| RADIATED LONG-WAVE RADIATION. THE ANODIZED ALUMINUM (WHITE)   |   |
| DISKS KEFLECT IN THE VISIBLE HANGE BUT ARE BLACK TO IN BEYOND /<br>MICRONS, THESE ABSORB THE RERADIATED ENERGY PROM THE EARTH |   |
| T AND REFLECTED   |   |
| BADIATION. ONE BLACK/WHITE PAIR WILL OPERATE AS RADIATIVE   |   |
| COLLIBATOR PETECTORS, STRILLAR TO ESSE.<br>BW THERMAL PEEDBACK DESIGN. THE ENERGY   |   |
| CONSTANT TEMPERATURE WILL BE MEASURED. THE SET OF 4 RADIOMETERS   |   |
| ARE MOUNTED BETWEEN THE 2 SCANNING RADIOMETERS AND POINT TO THE NADIR. THE FIELD OF VIEW IS 180 DEGREES FOR ALL FOUR SENSORS. |   |
|   |   |
| 32. PHENOMENA OBSERVED  |   |
| ENERGY RADIATED PROM AND REZLECTED BY THE EARTH'S ATMOSPHERE<br>33 MEASUREMENT RANGE  |   |
|   |   |
| 34. PRECISION AND ACCURACY  |   |
|   |   |

| IN STRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | 38. SPECTRAL RESOLUTION 34. TIME CONSTANT  0.45 TO 0.65 MICRON NA 38. FIELD OF VIEW  38. GROUND SWATE  37. 5 DEC 4.00 NM DIEM CIRCIP PROM 6.00 NM BITTHIND |
|--|--|
| 1. TITLE 2. ACRONYM 3. EXP NO  | INCAR HESOLUTION OF SPATIAL RESOLUTION   |
| ADVANCED VIDICON CAMBRA SYSTEM   | ER PROM 575 NM   |
| 11/10/69   | MED CIRCILLAR S  |
|  | mante machantanantan   |
| BEBRIS, J. GODDARD SPACE FLT CENTER 617-494-2532  B. CO-INVESTIGATOR 10. ORGANIZATION  | 4). COMPONENTS   |
| GODDARD SPACE PLT CENTER 301-982   | VIDICON CAMERAS, ASSOCIATED ELECTRONICS  |
| CONTRACT NUMBER 14. PLAST INDEX NUMBER 15. DATE  | 63 LB 27 WATTS   |
| 19. AGENCY 20.PGM OFFICE 21. TELEPHO   | E 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE   |
| SCHARDT, B. B.   | 58. CALIBRATION SENSITIVE 80. DATA RECOVERY (MAGNETIC SHIELDING USERVATION)  |
| RO-ELECTRONICS PRINCETON, N.J. 08/64 NA  | TOR DELAYED TELEMETRY  |
| TENTONE THE CONTENT OF THE PROPERTY OF THE PRO | NIMBIS S-BAND HOANSETHERD HOED TO HOANSMIT UIDED STONAL HO   |
| 29. SPACECRAFT   | STATION USING THE 1707.5 MHZ FREQUENCY.  |
| MET, BESP NIMBUS 1   | 63 ADVANTAZES AND LIMITATIONS  |
| THORAG CHE TO COMPAND THE PROPERTY OF THE PROP | es. ADVANIACES AND LIMITAL CONS  |
| URPOSES, ***SECON  |  |
| TO TEST THE SYSTEM IN SPACE PRIOR TO APPLICATION IN AN OPERA-  | 64. REFERENCES   |
|  | 1) SIG ACHIEV IN SAT MET 1958-1965, NASA SP-96,***2) INSTRUMENTS   |
|  | AND SPACECRAPT OCT 57-MAR 65, NASA SP-3028, ***3) NIMBUS I USER'S  |
| 31. PRINCIPLES OF OPERATION  | CATALOG: AVCS AND APT 1965, GSFC.***4) OSTBON, H.; REVIEW OF A DE-   |
| THE AVCS TEST PLOWN ON NIMBUS 1 AND 2 AND OPERATIONALLY ON ESSA  | SYMP SOC PHOTO-OPTICAL ENGR. WASH, D.C. 19-23 AUG. 68.***5) DATA   |
|  | ABLE PROM NATIONAL WEATHER RECORDS CTR (ESSA) ASHEVILLI  |
| VIE  |  |
| BD IN A FAN-LIKE ARRAY TO PRODUCE A 3-SEGRENT COMPOSITE PICTURE.   | SINILAR TO AVCS ON NIMBUS 2, RSSA 3, AND ESSA 5.   |
|  |  |
| TICAL. A   |  |
| 124  |  |
| OF WITH WE PICTURES FOR ORBIT ACQUIRED. THE FICKUP TUBES ARE 633   |  |
| O.5 NW AT THE OPTICAL CENTER AT 575 NW ALT. EACH OF THE 3 CAM-   |  |
| ERAS EMPLOY A 17 MM P/4 LENS WITH A SERVOCONTROLLED IRIS FOR EX-   |  |
| T AT 40 MILLISEC EXPO  |  |
| TIERS OPENING PROM P/16 WHEN THE SPACECRAPT IS OVER THE ECHANCE  |  |
| TO P/4 WHEN THE S/C IS NEAR THE POLES. THE CAMERAS ARE PROGRAM-  |  |
| MED TO OPERATE ONLY AT A SUN ANGLE OF HIGHER THAN 85 DEG. A TAPE   |  |
| D 2 COMPLETE   |  |
| 19.2 FICTORES. THESE VIDEO, SIGNALS ARE TRANSMITTED TO THE GROUND IN 4 MIN USING THE 1707.5 MHZ TRANSMITTER  |  |
| 32. PHENOMENA OBSERVED   |  |
| CLOUD COVER OVER THE EARTH'S SURFACE   |  |
| DYNAMIC RANGE OF 14 TO 11400 FOOT-LAMBERTS   |  |
| 34. PRECISION AND ACCURACY   |  |
| 8-10 LEVELS OF GRAY, 833 LINE RESOLUTION   |  |

| NSTATING TARGET  | 38. SPECTRAL RANGE                |
|--|-----------------------------------|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  | 0.45 TO 0                         |
| ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 89.0 BY 89.0                      |
|  | 40.ANGULAR RESOLUTION 41. SPATIAL |
| AUTOMATIC PICTURE-TRANSMISSION SYSTEM APT  |                                   |
| A RESUME<br>DATE   | 3 ACCURACY 43. P                  |
| A BRINGIAN INVESTIGATION 17 OBCANIZATION (5 TEL FRONCE   | 1.0 DEG 0.1                       |
| CORPUS BID BOARD CONTRACTOR  | 40. SPECIAL MEDOINEMENTS          |
| 10 ORGANIZATION  | 47. COMPONENTS                    |
|  | VINCETED NOUTO                    |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 13. START 16. CONTRACT NUMBER 13. STATUS       | 48. WEIGHT 49. VOLUME             |
|  | 30 LB                             |
| 19. AGENCY 20. PGM OF PICE   | 54. INTERPERENCE 55. INTERPERENCE |
| L. B. B. NASA HDOTRS OSSA/SRN 202-962-   | SENSITIVE SENSITIVE               |
| DO B SCHOOL DE DOMENTES DOTACORDO N T 00 ACT NA  | PTOUCTAY MADES THE                |
| RAUMENT TYPE   | 62. TELEMETRY REQUIREMENTS        |
| CH AUTOMATIC-PICTURE-TRANSMISSION VIDICON  | PICTURE IS COMMUNIC               |
| 28. APPLICATION 29. SPACECRAFT   | BAND OF 136-137 MHZ               |
| MET. NIMBUS 1  | PREDUENCY CAPABILIT               |
| as DAHOA is  | 63. ADVANTAGES AND LIMITATION     |
| PRIMARY-TO PROVIDE REAL-TIME WIDE-ANGLE CLOUD COVER PICTURES FOR                                       | DIRECT TRANSMISSION               |
| USE BI LOCAL USERS. *** * SECONDARI-CHECKOUT FOR SENSORS TO BE USED IN PUTURE OPERATIONAL TOS FLIGHTS. | MEDIATE STURAGE, UL               |
|  | 1) SIG ACHIEV IN SAT              |
|  | AND STROUD, W.G.: TI              |
| 31, PRINCIPLES OF OPERATION  | SMPTE, VOL 73, FEB                |
| THE APT SYSTEM, CONSTSTING OF A 1-IN VIDICON ARRANGEMENT, WAS  | FOROLOGY DRESENTED                |
| TEST FLOWN ON TIROS 8 AND NIMBUS 1 AND 2 (1 CAMERA), PRIOR TO  |                                   |
| OPERATIONAL TOS PLICHTS (BSSA 2,4,6) AND TIROS M (2 CAMERAS).  | 65. HISTORICAL REMARKS            |
| THE VIDICON USED INITIALLY (TIROS 8 AND NIMBUS 1), HAD A DI-   | SIMILAR TO APT ON N               |
| ELECTRIC LATER DEPOSITED ON THE GUN SIDE OF THE PHOTOCONDUCTOR   | 66. DIAGRAMS                      |
| TO STORE THE SCENE INFORMATION, HOWEVER, SINCE THE ELECTRON BEAM                                       |                                   |
| ANDERED IND BLECKER LYCKERIES OF INTO SOURFACE, THE YEAR   |                                   |
| TIC. 108-DEG. WIDE ANGLE, P.7.8 ORIPOTTURE LIBERTAL AS, 7 MM PL.                                       |                                   |
| THE SYSTEM AUTOMATICALLY TAKES AND TRANSMITS A PICTURE EVERY 208;                                      |                                   |
| SECS WHILE THE SATELLITE IS IN DAYLIGHT. OPTICAL EXPOSURE TIME   |                                   |
| MILLISEC,  | • • •                             |
| TUBE ELEMENT. AN 8-SECOND TUBN-ON AND SYNC-SIGNAL PRECEDES THE   |                                   |
| ACC SECOND TRENSELVENCY, AT WHICH TIME THE VIDICON IS SCRENED AT                                       |                                   |
| PERPENDICULAR TO THE ORBIT TRACK, A 5-WATT TV TRANSMITTER BROAD-                                       |                                   |
| CASTS THE SIGNAL IN THE 136.95 MHZ BAND. AN APT GROUND STATION   |                                   |
| RECEIVER, AND A  |                                   |
| IS WITH  |                                   |
| CONFATIBLE WITH CONFESCIAL   |                                   |
| CLOUD AND TERRAIN PEATURES OF APPROX 1,7 NM OR LARGER  |                                   |
| 33. MEASUREMENT RANGE  |                                   |
| DINABLIC PICTURE HANGE OF 10:1   |                                   |
| A 40 10 I PUPIC OF SECUENCIAL VANDER VANDERANCOM   |                                   |
|  |                                   |

| TO DESCRIPTION OF THE STATE AND ALLENN HE PROMISED NOT ALLITUDE AND ALLENN HE PROMISED NOT ALLEND HE PROMISED NOT ALL NOT ALL NOT ALLEND HE PROMISED NOT ALL         | _                | AANGE  |
|--|------------------|--|
| 69.0 BY 89.0 DEG 925 BY 925 NN FROM 600 NN  6.0.162 DEG APPROXIANTS TITLE RESOLUTION  1.0 DEG 0.1 DEG SECINE SECURIOR  4. TO DEG 0.1 DEG/SEC NED SECENTRICISE  4. TO DEG 0.1 DEG/SEC NED SECENTRICISE  4. TO DEG 0.1 DEG/SEC NED SECENTRICISE  4. NOTION TO DEG 0.1 DEG/SEC NED SECENTRICISE  4. NOTION TO DEG 0.1 DEG/SEC NED SECENTRICISE  4. NOTION TO DEG 0.1 DEG/SEC NED SECENTRICISE  5. CALIBRATION  ELDUCTAL HARKS INCLUDED REALTINE TELENTRY  5. CALIBRATION  FLONGIAL HARKS INCLUDED REALTINE TELENTRY  5. ADVANTAGES AND UMINICATED TO AN EARTH STATION IT  BAND OF 136-137 MHZ. THE VIDEO OUTPUT REQUIRES  PROUGH OF A DEGLES ON COMMINICATE OF VIDEO OUTPUT REQUIRES  TO STEAM STANDING SECOND ON COMMINICATE OF VIDEO OUTPUT REQUIRES  TO STEAM STRUCKS  1) SIG SCHIEW IN SAT HET 1958-1964, NASA SP-96, AND STRUCKS  AND STROUD, W.G.: THE APT TV CANERR SYSTEMS DO SHORE OF VIDEO OUTPUT REQUIRES  5. MESTERNOES, THE APT TV CANERR SYSTEMS DO SHORE OF VIDEO OUTPUT REQUIRES  1) SIG SCHIEN SAT HAN SAT HET 1958-1964, NASA SP-96, AND STRUCKS  1) SIG SCHIEN SAT HAN SAT TY CANERR SYSTEMS DO SHORE OF VIDEO OUTPUT REQUIRES  5. MESTERNOES, THE APT TY CANERR SYSTEMS DO SHORE OUTPUT REQUIRES  5. MESTERNOES, THE APT TY CANERR SYSTEMS DO SHORE OUTPUT REQUIRES  5. MESTERNOES, THE APT TY CANERR SYSTEMS DO SHORE OUTPUT SHORE OUTP         |                  | UND SWA  |
| 42. COMPONENTS  1.0 DEG APPROXIMATELY 1.7 NM FROM 600 NM 22. POINTING RATE  1.0 DEG APPROXIMATELY 1.7 NM FROM 600 NM 2. POINTING RATE  1.0 DEG O.1 DEG/SEC NED CENTRIC SUI  4. COMPONENTS  2. COMPONENTS  2. LB  2. LB  2. LB  2. LB  2. LB  2. CALEMETER RECORD  2. LB  3. LB  4. NATARIANA  3. LB  4. NATARIANA  4. NATARIANA  5. THE WIDO OUTPUT REPUBLIES  5. LB  5. ADVANTAGES AND LMITATIONS  DIELECTRIC SURRAC OF VIDICO  3. LB  3. LB  3. LB  3. LB  4. REFERENCES  3. LB  5. ADVANTAGES AND LMITATIONS  5. THE APT TV CARERA SYSTEM PO  5. NETE, VOL 73, FEB 1969.***3) OSTROW, H AND IN  REVIEW OF A DECABE OF SPACE CAMERA SYSTEM PO  5. HEFENOCAL REMARKS  5. LB  5. HEFENOCAL REMARKS  5. LB         | -                | BY 925 NM PROM 600 NM  |
| 42 POINTING RATE  43 POINTING RATE  44 ALTITUDE  45 SPECIAL REQUIREMENTS  47 COMPONENTS  47 COMPONENTS  48 VEICHT  49 VOLUME  49 VOLUME  40 VOLUME  40 VOLUME  40 VOLUME  40 VOLUME  50 DATA RECOVERY  51 DECTROTICES  52 RASTITUDE  53 DLB  54 NATERIERISES  56 NATERIERISES  56 NATERIERISES  56 NATERIERISES  57 NATERIALIZE  58 NATERIALIZE  58 NATERIALIZE  59 NATERIALIZE  50 DATA RECOVERY  50 DATA RECOVERY  51 DECTRORE  52 NATERIALIZE  53 DAYANTAGES AND UNITATIONS  54 NATERIALIZE  55 DAYANTAGES AND UNITATIONS  56 DAYANTAGES AND UNITATIONS  57 DIRECT TRANSMISSION ON COMMAND TO MANY RECEIVE  58 ADDAWATAGES AND UNITATIONS  59 NATERIALIZE  50 DAYANTAGES AND UNITATIONS  50 NATERIALIZE  51 STROUD, W.G.: THE APT TY CAMERA SYSTEM POINT  58 NATERIALIZE  59 DAYANTAGES AND UNITATIONS  50 NATERIALIZE  50 NATERIALIZE  51 STROUD, W.G.: THE APT TY CAMERA SYSTEM POINT  56 NATERIALIZE  57 NATERIALIZE  58 ADDAWATAGES AND UNITATIONS  59 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  51 NATERIALIZE  52 NATERIALIZE  53 NATERIALIZE  54 NATERIALIZE  55 NATERIALIZE  56 NATERIALIZE  57 NATERIALIZE  58 NATERIALIZE  58 NATERIALIZE  59 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  51 NATERIALIZE  52 NATERIALIZE  53 NATERIALIZE  54 NATERIALIZE  55 NATERIALIZE  56 NATERIALIZE  57 NATERIALIZE  58 NATERIALIZE  59 NATERIALIZE  59 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  51 NATERIALIZE  52 NATERIALIZE  53 NATERIALIZE  54 NATERIALIZE  55 NATERIALIZE  56 NATERIALIZE  57 NATERIALIZE  57 NATERIALIZE  58 NATERIALIZE  58 NATERIALIZE  58 NATERIALIZE  59 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  50 NATERIALIZE  51 NATERIALIZE  52 NATERIALIZE  53 NATERIALIZE  54 NATERIALIZE  55 NATERIALIZE  56 NATERIALIZE  57 NATERIALIZE  57 NATERIALIZE  58 NATERIALIZE  58 NATERIALIZE  59 NATERIALIZE  59 NATERIALIZE  50          | 0                |  |
| 46. SPECIAL REQUIREMENTS  47. COMPONENTS  47. COMPONENTS  47. COMPONENTS  48. WEIGHT PROUGHERS, TRANSHITTER, TAPE RECORD  48. WEIGHT PROUGHERS, TRANSHITTER, TAPE RECORD  48. WEIGHT PROUGHERS, TOURNESS, STREET, STREET, STREET, SERVERT, SE         | Ž O Š            | 43. POINTING RATE LY 1. 7 NM FROM 600 NM 43. IN                            |
| 10. COMPONENTS  11. COMPONENTS  12. COMPONENTS  13. VIDICON  13. VIDICON  13. VIDICON  13. VIDENT  13. VIDICON  13. VIDENT  13. VIDENT  13. VIDENT  13. VIDENT  14. WIGHT  15. VIDENT  15. VIDENT  16. VIDENT  17. VIDENT  18. VIDENT  19.         | 3                | DEG/SEC MED RCCENTRIC SUN-SYNCH  |
| 4. COMPONENTS  4. VIDICON, ELECTRONICS, TRANSHITTER, TAPE RECORD  4. WIGHT AND COLUME  5. OLLIME  6. OLLIME  6         | $\Box$           |  |
| 4. VEDICON, ELECTRONICS, TRANSHITTER, TAPE RECORD  4. WEIGHT   AG VOLUME   AG AVGRAGG FOWER   ALSTANDRY FORCE    3. DLB   ANGRATCH   AG VOLUME    5. ENSITYTE   SENSITYE   AG AVGRAGG FOWER    8. CALERATION   ARKS INCLODED   REALTINE TELEMETRY    8. CALERATION   ARKS INCLODED   REALTINE TELEMETRY    9. TELEMETRY REQUIREMENTS   AG DATA RECOVERY    10. DATA RECOVERY   AG A A  | Ţ                |  |
| 30 LB  | 7                | VEIGHT LA VOLUME BY AVERAGE POWER IN STANDER POWER IS STANDER OF PER POWER |
| SENSITY OF STATEMENT OF STATEME         | Ħ                | 30 LB 40 WATTS   |
| SERNITIVE SENSITIVE:  SE CALIBRATION  REDUCLAL MARKS INCLUDED BRALTINE TELEMETRY  S.2. TELEMETRY REQUIREMENTS  PICTURE IS COMMUNICATED TO AN EARTH STATION IT  BAND OF 136-137 MHZ. THE VIDEO OUTPUT REQUIRES  PRECUENCY CAPABILITY.  S. ADVANTAGES AND LIMITATIONS  DIRECT TRANSMISSION ON COMMAND TO MANY RECEIV  MEDIATE STORAGE, DIELECTRIC SURFACE OF VIDICO  MAND STROUD, W.G.: THE APT TY CAMERA SYSTEM FOR  SMPTE, VOL. 73, FEB 1969.***3) OSTROW, H. AND IT  REVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DE  REVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DE  BOROLOGY, PRESENTED AT 13TH ANNUAL TECH SYMP ES, HISTORICAL REMARKS  SIMILAR TO APT ON NIMBUS 2: ESSA 2, 4.6: TIROS, B.  SE DIAGRAMS          | _j               | 56. INTERFERENCE 57. INTERFERENCE  |
| PIDUCIAL MARKS INCLUDED REALTINE TELEMETRY  5.2 TELEMETRY REQUIREMENTS  PICTURE IS COMMUNICATED TO AN EARTH STATION IT  BAND OF 136-137 MHZ. THE VIDEO OUTPUT REQUIRES  5.2 ADVANTAGES AND LIMITATIONS  MEDIATE STORAGE. DIELECTRIC SURFACE OF VIDICOIS  6.4 REFERENCES  1) SIG ACHIEV IN SAT MET 1958-1964. NASA SP-96.  AND STROUD, W.G.: THE APT TY CANERA SYSTEM POIS  AND STROUD, W.G.: THE 3PC EAMERA SYSTEM POIS  BOROLOGY. PRESENTED AT 13TH ANNUAL TECH SYMP ( 5.**HYDIRICAL NEMARKS  SIMILAR TO APT ON NIMBUS 2:ESSA 2, 4.6:TIROS. 8  5. DIAGRAMS  SE DIAGRAM         | _                | SENSITIVE   60. DATA RECOVERY  |
| PICTURE IS COMMUNICATED TO AN EARTH STATION IN BAND OF 136-137 MHZ. THE VIDEO OUTPUT REQUIRES PREDOUENCY CAPABILITY.  52. ADVANTAGES AND LIMITATIONS  DIRECT TRANSMISSION ON COMMAND TO MANY RECEIVER MEDIATE STORAGE. DIELECTRIC SURFACE OF VIDICON AS. REFERENCES  1) SIG ACHIEV IN SAT MET 1958-1964. NASA SP-96.*  AND STROUD, W.G.: THE APT TV CAMERA SYSTEM FOR SMPTE, VOL 73, FEB 1969.****3) OSTROW, H. AND WIREVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DEVICKY. PRESENTED AT 13TH ANNUAL TECH SYMP OF SMPTE, VOL 05.***4) BALARRISHAAN:ADV IN COMM SYSTEMS, VOL 1.  65. HISTORICAL REMARKS  SIMILAR TO APT ON NIMBUS 2: ESSA 2, 4.6: TIROS B.  66. DIAGRAMS  AND STROUD OF THE OWN SYSTEMS, VOL 1.  66. DIAGRAMS  AND STROUD OF THE OWN SYSTEMS, VOL 1.  |                  | REALTINE TELEMETRY   |
| BAND OF 136-137 MHZ. THE VIDEO OUTPUT REQUIRES  PREDUIRICY CAPABILITY.  DIRECT TRANSMISSION ON COMMAND TO MANY RECEIVER MEDIATE STORAGE, DIELECTRIC SURFACE OF VIDICON  M. REFRENCES  1) SIG ACHIEV IN SAT MET 1958-1964, NASA SP-96, AND STROUD, W.G.: THE APT TV CANERA SYSTEM FOR SMPTE, VOL 73, FEB 1969.***3) OSTROW, H. AND WERVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DRYIE BOROLOGY. PRESENTED AT 13TH ANNUAL TECH SYMP OF SHISTORICAL REWARKS AND IN COMM SYSTEMS, VOL 1,  65, HISTORICAL REWARKS  SIMILAR TO APT ON NIHBUS 2: ESSA 2, 4,6: TIROS 8.  66. DIAGGRAMS  SIMILAR TO APT ON NIHBUS 2: ESSA 2, 4,6: TIROS 8.   | Š                | TO AN EARTH STATION IN THE SPACE RE  |
| DIRECT TRANSMISSION ON COMMAND TO MANY RECEIVER MEDIATE STORAGE, DIELECTRIC SURFACE OF VIDICON MANY REFERENCES  1) SIG ACHIEV IN SAT HET 1958-1964, NASA SP-96, NASH STROUD, W.G.: THE APT TV CAMERA SYSTEM FOR SMPTE, VOL 73, FEB 1969.***3) OSTROW, H. AND WE REVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DRY BE NOTEW, OF TRESENTED AT 13TH A NNUAL TECH SYMP OF SHALLAR TO APT ON NIHBUS 2: ESSA 2, 4,6; TIROS 8.  55. DIAGRAMS  56. DIAGRAMS  56. DIAGRAMS  57. DIAGRAMS  58. DIAGRAMS  58. DIAGRAMS  58. DIAGRAMS  59. DIAGRAMS  50. DIAGRAMS  50. DIAGRAMS  50. DIAGRAMS  50. DIAGRAMS  51. DIAGRAMS  52. DIAGRAMS  53. DIAGRAMS  54. DIAGRAMS  55. DIAGRAMS  56. DIAGRAMS  57. DIAGRAMS  58. DIAGRAMS  58. DIAGRAMS  58. DIAGRAMS  59. DIAGRAMS  59         | Т                | OF 136-137 MHZ. THE VIDEO OUTPUT REQUIRES 4000 HZ                          |
| DIRECT TRANSMISSION ON COMMAND TO MANY RECEIVES  MEDIATE STORAGE, DIELECTRIC SURFACE OF VIDICON  MEDIATE STORAGE, DIELECTRIC SURFACE OF VIDICON  NOT STROUD, W.G.: THE APT TV CAMERA SYSTEM FOR SMPTE, VOL 73, FEB 1969.***3) OSTROW, H. AND WIRE SMPTE, VOL 73, FEB 1969.***3) OSTROW, H. AND WIRE SMPTE, VOL 73, FEB 1969.***4) OSTROW, H. AND WIRE SMPTE, VOL OF PRESENTED AT 13TH ANNUAL TECH SYMP OF SMPTONICAL REMARKS  SE HISTORICAL REMARKS  SE DIAGRAMS  SE DIAGRAM         | Ţ-               | EXEQUENCY CARABILITY.  |
| 4. REFERENCE STORAGE, DIELECTRIC SURFACE OF VIDICON AN EFFERENCE STORAGE. N. SAT MET 1958-1964, NASA SP-96.*  1) SIG ACHIEV IN SAT MET 1958-1964, NASA SP-96.*  AND STROUD, W.G.: THE APT TV CAMERA SYSTEM FOR SMPTE, VOL 73, FEB 1969,***3) OSTROW, H. AND WIREVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DEVICED BOROLOGY. PRESENTED AT 13TH ANNUAL TECH SYMP OI ***49, BALAKRISHNAN:ADV IN COMM SYSTEMS, VOL 1, G. HISTORICAL REMARKS  66. HISTORICAL REMARKS  66. DIAGGRAMS  66. DIAGGRAMS  66. DIAGGRAMS  67. DIAGGRAMS  68. DIAGGRAMS  | 8                | INSMISSION ON COMMAND TO MANY RECEIVERS WITHOU                             |
| 1) SIG ACHIEV IN SAT MET 1958-1964, NASA SP-96, AND STROUD, W.G.: THE APT TV CANERA SYSTEM FOR SHORE, VOL 73, FEB 1969,***3) OSTROW, H. AND WE REVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DEVISED OF THE ANNUAL TECH SYMP OF SECHISTORICAL REMARKS SIMILAR TO APT ON NIMBUS 2:ESSA 2,4,6:TIROS. B. S. DIAGRAMS   |                  | CORAGE, DIELECTRIC SURFACE OF VIDICON LIMITED                              |
| AND STROUD, W.G.: THE APT TV CAMERA SYSTEM FOR SMPTE, VOL 73, FEB 1969;***3) OSTROW, H. AND WERVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DEVROUGE, PRESENTED AT 13TH ANNUAL TECH SYMP DISCROLOGY. PRESENTED AT 13TH ANNUAL TECH SYMP DISCROLOGY BALAKRISHNAN:ADV IN COMM SYSTEMS, VOL 1, CS. HISTORICAL REMARKS  SE DIAGRAMS   |                  | LEV IN SAT MET 1958-1964. NASA SP-96.***21                                 |
| SMPTE, VOL 73, FEB 1969.***3) OSTROW, H, AND WI<br>REVIEW OF A DECADE OF SPACE CAMERA SYSTEMS DRY<br>BOROGY PRESENTED AT 13TH ANNUAL TECH SEN SYSTEMS.<br>65. HISTORICAL REWARKS<br>55. DIAGRAMS  56. DIAGRAMS  56. DIAGRAMS  57. DIAGRAMS  58. DIAGRAMS  58. DIAGRAMS  59. DIAGRAMS  50. DIAGRAMS  60. DIAGRAMS |                  | AMERA SYSTEM FOR MET   |
| REVIEW OF A DECADE OF SPACE CARERA SYSTEMS DEVICED OF SPACE CARERA SYSTEMS DEVICED OF STATE O         |                  | OSTROW, H. AND WEINST  |
| ECHCLOGY, PRESENTED AT 13TH ANNUAL TECH SYRP OF \$4************************************  | Т                | MERA SYSTEMS DEVELOPMENT FOR   |
| 65. HISTORICAL REMARKS SIMILAR TO APT ON NIMBUS 2: ESSA 2, 4,6: TIROS 8: 65. DIAGRAMS  |                  | INUAL TECH SYMP OF SPIE, AUG<br>SYSTEMS, VOL 1, CHAPTER 5,SI               |
| SENTIAR TO APT ON NIMBUS 2: ESSA 2, 4,6: TIROS 8: Se. DIAGRAMS   |                  |  |
|  |                  | TO APT ON NIMBUS 2: ESSA 2, 4,6; TI3OS 8:                                  |
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| NATIO  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONISC RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 38. FIELD OF V          |
| 1, 1176  |  | 40.ANGULAR RESC         |
| HIGH-RESOLUTION INPRARED RADIOMETER  | TARED RADIOMETER   | 42 POINTING ACCUR       |
|  | 69/  | 1.0                     |
| 6. PRINCIPAL INVESTIGATOR  | 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL RE          |
| FOSHEE, L. L.  | GODDARD SPACE PLT CRNTER   |                         |
| 9. CO-INVESTIGATOR   | 10. ORGANIZATION 11. TELEPHONE   | 47. COMPONEN            |
| 12. CONTRACT 13. CONTRACT NUMBER   | BER 14. FLASH INDEX NUMBER 10. START 10. DARE 10. DARE 10. DARE 10. DARE 10. DARE 10. TEHT   | 48. WEIGHT              |
| 18. MONITOR  | 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 54. PATERCEPEN          |
| SCHARDT, B. B.   | OSSA/SRN 202-962-  | SENSITIV                |
| 22. VENDOR   | DE LA VID THATANA  | SS. CALIBRATIC          |
| 26 INSTRUMENT TYPE   | FORT HAINE, INULANA 105/04   | 62, TELEMETRY           |
| RADIOMETER, SINGLE-CHANNEL   | SCANNING INFRARED  |                         |
| 28. APPLICATION  | 29. SPACECRAFT   | FROM 0 TO               |
| MET, ERSP  | NIMBUS 1   |                         |
| PRIMARY-TO MAP THE EMENTING THE TA COVER   | 132  | USEFUL D                |
| ****SECONDAKY- TO REA<br>TOPS AND TERBAIN FEA  | REATURES.  | 1) NIMBUS<br>V. 1. GSFC |
| 31. PRINCIPLES OF OPERATION  |  | MENTS FOI               |
| THE SINGLE-CHANNEL SOME OF THE STREET OF THE STREET OF THE STONE ARE   | THE SINGLE-CHANNEL SCANNING HRIR HAS PLOWN ON NIMBUS 1 AND 2. MODIFIED VPRSIONS ARE SCHEDULED FOR PLIGHT ON NIMBUS B AND D.  | PROM: NI                |
|  | (PBSE)   | 65. HISTORICA           |
| TIVE CELL WHICH IS RATES IN THE 3.4 TO 4.  | CELL WHICH IS RADIATION COOLED TO -75 DEGREES C AND OPER-IN THE 3.4 TO 4.2 MICRON REGION. COOLING IS ACCOMPLISHED BY   | ALSO FLOS               |
| MEANS OF A BLACK COOLIN  | LING PATCH AT THE BOTTOM OF A HIGHLY REFLEC-<br>N. THE RADIOMETER HAS AN INSTANTANBOUS   |                         |
| POV OF 0.5 DEG, WHICH  | NAME THE SCAN MIRROR IN TACTION AS OBSERVED TO   |                         |
| THE AXIS OF ROTATION AND   | CONTINUOUSLY ROTATES THE   |                         |
| OF THE DETECTOR THROUGH OF THE OFFICE OF THE OFFICE | DETECTOR THROUGH 360 DEG IN A PLANE NORMAL TO THE SPACE-<br>PLOCITY. THE VIEW OF THE HOUSING AND SPACE DURING A  |                         |
| ω,   | O AND WARM BODY CALIBRATION POINTS. THE  |                         |
| AT THE POCUS OF A 4  | CASSEGRAINIAN TELESCO  |                         |
| IT IS THEN REPOCUSED   | THEN REPOCUSED AT THE DETECTOR BY RELAY HIRRORS WITH THE DESIGN GAVERENCES WITHER RETURN THEM. THE SCAN BATE IS  |                         |
| 44.7 RPB. THE OUTPU  |  |                         |
| 280 HZ. THE INFORMATION CORMAND.   | TION IS STORED ON TAPE FOR PLAYBACK ON   |                         |
| 32. PHENOMENA OBSERVED   |  |                         |
| EMITTED SURFACE RADIATION  | ATION FROM 3,4 TO 4,2 MICRONS  |                         |
| RADIANCE TEMPERATURE BETWEEN   | BETWEEN 210 AND 330 DEG K  |                         |
| NOISE EQUIV TRUP DIP   | NOISE EQUIV TRHP DIPP OF 1 K DEG POR A 250-DEG K BACKGROUND  |                         |
|  |  |                         |

| <u> </u>                                | 38. SPECTRAL RANGE 38. SPECTRAL RESOLUTION 37. TIME CONSTANT 3.4 TO 4.2 MICRONS  |
|---|--|
| ON AX                                   | 38. FIELD OF VIEW  90. BY 0.5 DEG 1300 NM BY 5 NM PROM 600 NM ALTITUDE  40 ANGULAR RESOLUTION SPATIAL RESOLUTION   |
| #000<br>000                             | 42. POWTING ACCURACY AS POINTING RATE 44 ALTITUDE 45. INCLINATION 1.0 DEG MRD CIRCULAR SUN-SYNCH RETROGRADE 46. SPECIAL REQUIREMENTS   |
|   | ENTS. TER, RECORDER, ELECTRONICS   |
| THU                                     | 40. WEIGHT 49. VOLUME 50 AVERAGE POWER 51. STANGEY FOWER 52. PEAK FOWER 53. MTBF 12 LB 4 WATTES AND 12 WATTES 14 WATTES AND 15 THE POWER 12 WATTES AND 15 THE POWER 15 THE POW |
| ME                                      | SUSITIVE SENSE SEN |
| D.V.                                    | TELEMETRY RECOURTERED BE SCAN DELATED IEEEREIAT INTENTIONAL TELEMETRY RECOURTERED, RESULTING IN A DC OUTPUT VARYING AND OF TO A TOTAL OF SHOW AND ANALYS.  |
| TT                                      | ND LIMITATIONS   |
| SIT.                                    | USEPUL DATA DURING NIGHTIME; RF INTERFERENCE DEGRADED SOME SCANS, MOYING PARTS.  |
|   | 1) NIBUS HIGH RESOLUTION RADIATION DATA CATALOG AND USERS MANUAL   |
| T                                       | MASA SP-156, 1967, *** 3GQLDBERG, I.L. METEOROLOGICAL IR INSTRU-   |
| <u> </u>                                | L ENGR, AUG 23, 1967.***4) HRIR DATA AVAILABL<br>TA, CODE 650, NASA SPACE SCIENCE DATA CTR, G  |
|   | 65. HSTORICAL REMARKS ALSO FLOWN ON NIMBUS 2, 3, MODIFIED VERSION WILL FLY ON NIMBUS D 66. DIAGRAMS  |
| ს                                       |  |
| 0 E E E E E E E E E E E E E E E E E E E |  |
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| TAILURG LABATTOLO  | 35. SPECTRA       |
|--|-------------------|
|  | 38. FIELD OF      |
| 1. TITLE 2. ACBONYM 3. EXP NO                                    | 37.0              |
| ADVANCED VIDICON CAMERA SYSTEM AVCS                              | 0.5               |
|  | 42, POINTING AC   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE           | 46. SPECIAL       |
| ARLAUSKAS, J. GODDARD SPACE FLT CENTER 301-982-6621              |                   |
| H. GODDARD SPACE PLT CENTER                                      | 3 VIDIC           |
| 3. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 18 COMPLETION |                   |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE               | 54. INTERFER      |
| B. B. NASA HDQTRS OSSA/SRN                                       | 59. CALIBRA       |
| ECTRONICS PRINCETON, N.J. 08/64 NA                               | GRAY-SC           |
| IMAGER, 1-INCH WIDE-ANGLE HIGH-RESOLUTION VIDICON UNC            | NIMBUS            |
| ION 29, SPACECRAFT   | GROUND            |
| MET. BRSP<br>30. PURPOSE   | 63. ADVANT        |
| RY-TO OBSERVE THE ENTIRE   | IMPROVE           |
| ONCE A DAY FOR METEOROLOGICAL RESEARCH PURPOSES. ***SECONDARY-   | AND LIF           |
| 5<br>4<br>5  | 1) SIGN           |
| -  | SP-96.*           |
| 31. PRINCIPLES OF OPERATION                                      | AND WEI           |
| IE AVCS TEST FLOWN ON NIMBUS 1 AND 2 AND OPERATIONALLY ON ESSA   | DEVELOP           |
| 3 AND 5 ARE SIMILAR EXCEPT POR THE LENS USED AND NIMBUS HAVING 3 | TIONAL 65 HISTORI |
| Z: ON MINBUSINE 3 VIDICON<br>RRAY TO PRODUCE A 3-SEGMENT         | STMILAR           |
| EACH CAMERA COVERS A 37 DEG POV WITH THE CENTER CAMERA POINT-    | 66. DIAGRAM       |
| ING STRAIGHT DOWN. THE OPTICAL AXIS OF THE OTHER 2 UNITS ARE RO- |                   |
| AND COVERS AN AREA OF APPROX 400,000                             |                   |
| MI WITH 96 PICTURES PER ORBIT ACQUIRED. THE PICKUP TUBES ARE 833 |                   |
|  |                   |
| ERAS EMPLOY A 17 MM F/4 LENS WITH A SERVOCONTROLLED IRIS FOR EX- |                   |
| POSURE ADJUSTMENT. SHUTTER SPEED IS SET AT 40 MILLISEC EXPOSURE  |                   |
| CECRAFT IS OVER  |                   |
| ZAR THE POLES, THE CAMERAS ARE PROGR                             |                   |
| 4 ج  |                   |
| PICTURES. THESE VIDEO SIGNALS ARE TRAN                           |                   |
| IN 4 MIN USING THE 1/0/.5 THE TRANSMITTER.                       |                   |
| CLOUD COVER OVER THE EARTH'S SURPACE                             |                   |
| 33. MEASUREMENT RANGE  |                   |
| AND ACCURACY   |                   |
| 8-10 LEVELS OF GRAY, 833 LINE RESOLUTION                         |                   |
|  |                   |

| O 10 10    | 35. SPECTRAL RANGE   36. SPECTRAL RESOLUTION   37. TIME CONSTANT   39. FIELD OF VIEW   37.0   DEG 400 NH DIAM CIRCLE PROH 600 NH ALTITUDE   40. ANGULAR RESOLUTION   41. POINTING RATE   44. ALTITUDE   43. INCLINATION   43. INCLINATION   44. INCLINATION   44. INCLINATION   44. INCLINATION   45. SPECIAL REQUIREMENTS   MED CIRCULAR   SUN-SPACH   RETROGRADE   46. SPECIAL REQUIREMENTS   46. SPECIAL REQUI   |
|------------|--|
| E          | 43 VIDICON CAMERAS, ASSOCIATED ELECTRONICS  48. WEIGHT G. VOLUME  63. IB   VAGNETIC   NAGNETIC   NA |
|            | SENSITIVE 60. DATA RECOVERY 61. FREQUENCY OF 61. FREQUENCY OF ALE CALIBRATOR DELAYED TELENETRY CONTINUOUS  |
| 2          | GROUND STATION USING THE 1707.5 HHZ PREQUENCY.   |
| Т.         |  |
|            | ICANT ACHIEVEMENTS IN SATELLITE KET, 1958-196<br>2) INSTRUMENTS AND SPACECRAPT OCT 57-MAR 65,<br>1 NIMBRIS 2 ISER'S CHIDE. GSPC. THEY 66, ****U.   |
| m          | REVIEW OF A DECADE OF SPACE CAMERA SYSTEMS IT., GSFC, 1968.***5) DATA AVAILABLE FROM NA-CADS CTR (ESSA), ASHEVILLE, N.C.   |
|            | SENILAR TO AVCS ON NIMBUS 1, ESSA 3, AND ESSA 5.   |
|            |  |
| m E        |  |
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|   |   | TE CREATER A MANAGE NEW TANKE OF THE PROPERTY |
|---|---|---|
| II IANOITAN   | INSTRUMENT RESUME   | 0.45 TO 0.65 MICRON NA  |
|   | ELECTRONICS RESERVENCENTER CAMBRIDGE, MASSACHUSETTS   | 77 000 77   |
| 1. TITLE  | 2. ACRONYM 3. EXP NO  | 483.0 BY 89.0 DEG 1200 NR BY 1200 NR FEUR BUO NR ALITIONE AGANGOLAR RESOLUTION RESOLUTION   |
| AUTOMATIC PICTURE-TRANSMISSION (TITLE CONT.)                                      | ISSION SYSTEM APT   | 42. POINTING ACCURACY 1-3. POINTING RATE 44. ALTITUDE 45. INCLINATION   |
| VVESTIGATOR   | 69/   | SYSEC MED CIRCULAR SU   |
|   | ACE PLT CENTER  | 4). COMPONENTS  |
| NTRACT NUMBER   | DEX NUMBER 115, START   | VIDICON, ELECTRONICS, TRANSMITTER, TAPE RECORDER 48. WEIGHT 49. VOLUME 59. AVERAGE POWER 51. STANDSV POWER 52. MTRE   |
| 24 01   | DOMOGELCE   | B MAGNETIC AC   |
| B. B.   | OUTRS 0   | SENSITIVE SENSITIVE   |
| CRO-ELECTRORICS   | N. N.J. 05/66   | THE PAPER S POLITICAL MARKS INCLUDED REALTINE TELEVETRY   |
| IMAGER, 1-INCH AUTOMATIC-PICTURE-TRANS  | MISSION VIDICON   | PICTURE IS COMMUNICATED TO AN EARTH STATION IN THE SPACE RES.   |
| ETT.  | NIMBUS 2  | Y CAPABILITY.   |
| PRIMARY-TO PROVIDE REAL-TIME WIDE-ANGLE   | CLOUD COVER   | INDROVEMENTS OVER PRIOR APT RELIABILITY, PERFORMANCE, AND LIFE  |
| USE BI LOCAL USERS. *** SECONDARI-CHECKO  | CONDANT-CHECKOUT FOR SENSORS TO BE USED IS FLIGHTS.   | CHANALTERISTICS.  |
|   |   | 1) SIG ACHIEV IN SAT MET 1958-1964, NASA SP-96.***2) STAMPFL, R. A. AND STROUD, W.G.: THE APT TV CAMERA SYSTEM POR MET SATS, JOUR   |
| 31. PRINCIPLES OF OPERATION   |   |   |
| THE APT SYSTEM WAS TEST PLOWN IN VARIOUS  | PLOWN IN VARIOUS MODES OF SOPHISTICATION  | 1966 1967.  |
| (ESSA 2,4,6) AND TIROS B. NIMBUS 2 USED   | AND Z, FRICK TO OFFICIAL TOS FLIGHTS.   | 65. HISTORICAL REMARKS  |
| VIDICON ARRANGEMENT DESIGNED TO OPERATE CAMERO MAD AN THEODOTOR                   |   | SIMILAR TO APT ON NIMBUS 1: RSSA 2, 4,5; TIROS 8; SCHED FOR TIROS M   |
| CONDUCTOR, THE CAMERA UT.   | -KINOPT   |   |
| ANGLE, F/1.8 OBJECTIVE LENS HITH A POCAL SYSTEM AUTOMATICALLY TAKES AND TRANSHITS | ERS WITH A POCAL LENGTH OF 6.0 MM. THE  |   |
| SECS WHILE THE SATELLITE  | SECS WHILE THE SATELLITE IS IN DAYLIGHT, OPTICAL EXPOSURE TIME  |   |
| IS 40 MILLISECONDS, GIVI.   | SS THAN 10 PERC   |   |
| THE 200 SEC TRANSMISSION, DURING THIS IS SCANNED AT POUR LINES PER SECOND, A      | THE 200 SEC TRANSMISSION. DURING THIS LATTER PERIOD, THE VIDICON IS SCANNED AT POUR LINES PER SECOND, AND THE SIGNALS TRANSMITTED |   |
| PRODUCING AN 800-LINE PICTURE WITH SCA  | PRODUCING AN 800-LINE PICTURE WITH SCAN LINES PERPENDICULAR TO THE ORDER TO DEPARTMENT THE STORY                                  |   |
| IN THE 136.95 HHZ SPACE TELEMETRY BAND.   | TELEMETRY BAND. AN APT GROUND STATION   |   |
| WITH AN APPROPRIATE ANTENNA, RECEIVER,<br>WITH SLOW SCAN TV TRANSHISSION CAN REC  | AND A RECORDER COMP<br>RIVE THESE PICTURES  |   |
| THE SPACECRAPT IS WITHIN ACQUISITION R. TIBLE WITH COMMERCIAL 240 RPH PACSIMIL.   | ACQUISITION RANGE, THE SYSTEM IS COMPA-<br>O RPM FACSIMILE ROUIDNENT.   |   |
| CLOUD AND TERRAIN PRATURES OF 2 NM OR   | ES OF 2 NM OR LARGER  |   |
| 33. MEASUREMENT RANGE   | 4 - 100   |   |
| DINABLE FILTIONE RANGE OF 25: 1   |   |   |
| 10 LEVELS OF GREY: 30-DB S/N AT 0.7 FO  | S/N AT 0.7 POOT-CANDLES/SEC   |   |
|   |   |   |

| HIGH-RESOLUTION INPRARED RADIONI (TITLE CQNT.) (FITLE CQNT.) (FOSHER L.L. GODDARD SP. (CO-INVESTIGATOR 10. ORGANIZATION 12.20N/MACT 13. CONTRACT NUMBER 14. FLASH IN | ETER  |
|--|---|
| INPRARED 7. ORG GODD 10. ORG   | E E   |
| 7. ORG.<br>10. ORG<br>10. ORG  |   |
| 10. ORC<br>10. ORC   | DIVOTOL LLE C   |
| STIGATOR 16 ORD  |   |
| 13. CONTRACT NUMBER  | SPACE FLT CENTER 11. TELEPHONE  |
|  | 14. FLASH INDEX NUMBER 16. START 16. CONFLETION 17. STATUS  |
| 20110  | Π:  |
| DR. R. NASA  | OSSA/SAN 202-962-   |
| AL LABS  | 23 LOCATION 24. DATE 29. LEAD TIME FORT WAYNE, INDIANA 05/66  |
| 78 INCHEST TTE<br>RADIOMENT TTE<br>38 ASSISTANTING   | CANNING INPRARED  |
| HET ERSP   | NIMBUS 2  |
| - TO MAP THE EARTH<br>COVERAGE DURING THE<br>RY-TO MEASURE THE<br>IS.  | 'S CLOUD COVER AT NIGHT TO COMPLEMENT E DAYTIME PORTION OF THE ORBIT.*** TEMPERATURES OF CLOUD TOPS AND TERRAIN   |
| 3). PRINCIPLES OF OPERATION  |   |
| E CHANNEL  | IN NIMBUS 1   |
| MODIFIED VERSIONS ARE SCHEDULED FOR FLIGHT ON NIMB<br>THE NIMBUS 2 HRIR CONTAINED A LEAD SELENIDE (PBSE)   | _   |
| TIVE CELL SHICH IS RADIATION<br>ATES THE THE 3 A TO A 7 MICRON   | ATTION COOLED TO -75 DEGREES C AND OPER-MICRON PROTON COOLING IS ACCOMPLISHED   |
| EANS OF A BLACK COOLING  | PATCH AT THE BOTTOM OF A HIGHLY   |
| FLECTIVE GOLD-COATED HORN. T<br>POV OF 1/2 DEG, WHICH AT AN A  | MATED HOMN. THE KADIORETER HAS AN INSTANTANCOUS WHICH AT AN ALTITUDE OF GOO NM GIVES A GROUND MATERIAL TO THE TANDER OF GOOD TO THE TANDER OF ME THE TANDER OF |
| THE AXIS OF ROTATION AND CONTINUOUSLY ROTATES THE  |   |
| _  | TOT   |
| LECTED   |   |
| AT THE FOCUS OF A 4 INCH F/1 IT IS THEN REFOCUSED AT THE D   | H 25  |
| -4.2 MICRON WAVELENGTH FI<br>7 RPM. THE OUTPUT SIGNAL  |   |
| 280 HZ. THE INFORMATION IS STORED MAND OR IS TRANSMITTED DIRECTLY TO   | STORED ON TAPE FOR PLAYBACK ON<br>TLY TO APT STATIONS.  |
| ENITTED SURFACE RADIATION PROM   | OM 3.4 TO 4.2 MICRONS   |
| ARADIANT TEMPERATURE BETWEEN 210 AND 330 DEGREES RELVIN  | 210 AND 330 DEGREES KELVIN  |

| 3.4 TO 4.2 HICRONS  9. FIELDO F VIEW  90. BY   |     | 35. SPECTRAL HANGE 37. TIME CONSTANT  |
|--|-----|---|
| ## FIELD DE TOUR OF THE PROPERTY OF THE PROPETTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPETTY OF THE PROPET |     | 3.4 TO 4.2 MICRONS  |
| A COMPONENT REPORTED BY THE RESOLUTION  ALE SPECIAL RECURRENCES  AL SPECIAL RECORDER, ELECTRONICS  AL SPECIAL SECURRENCE S. ATTRONES STATES OF SERVATION STATES ST |     | FIELD OF VIEW 38 GROUND SWATH   |
| 42 DIAGRAGOMENT STATEMENT  | 1   | מחדותם חויי המח המח היו שתו נות חוו   |
| ARDIOMERICA STRUCTURE ACCIDENT STRUCTURE STRUC |     | ALTITUDE  |
| ALS SECAL REQUIREMENTS  4. COMPONENTS  RADIOMETER, ERCORDER, ELECTRONICS  RADIOMETER, ERCORDER, ELECTRONICS  RADIOMETER, ERCORDER, ELECTRONICS  WEIGHT IN VOLUME  1.2. LB  WEIGHT IN VOLUME  1.2. LB  SENGITURE   | 7   | 43. POINTING RATE 44. ALTITUDE 45. INCLINATION  |
| RADIOMORNINS  RADIOMORNINS  RADIOMORNINS  TOTAL  TO |     | SPECIAL REQUIREMENTS  |
| ALDIOMETER, BECONDER, ELECTRONICS  4. MAINT   40 VOLUME  5. MAINT   40 VOLUME  6. MAINT   40 VALUME  7. MAINT   40 VALUME  7. MAINT   40 VALUME  8. MAINT   40 VALUME  8. MAINT   40 VALUME  8. MAINT  |     |   |
| RESIDENCE RECORDER, RECORDER, RECORDER, RESERVENCE TO THE STANDS FORCE TO THE STANDS FOR THE STANDS FORCE TO THE STANDS FORCE FORCE TO THE STANDS FORCE FORCE FOR STANDS FORCE FORCE FORCE FOR STANDS FORCE FORCE FORCE FOR STANDS FORCE FORCE FOR STANDS FORCE FORCE FOR STANDS FORCE FORCE FORCE FOR STANDS FORCE FORCE FORCE FOR STANDS FORCE FORCE FORCE FORCE FOR STANDS FORCE FORCE FORCE FORCE FOR STANDS FORCE FORCE FORCE FOR STANDS FORCE FORC |     | 47. COMPONENTS  |
| 48 WEIGHT AS VOLUME OF A AVEGENE POWER IS INTERCHALE TO BE A WEIGHT AS A AVEGENE POWER IS INTERCHALEDING  58 MINISTRACE AND AVEGNE PARTY OF THE PROPERTY OF THE PARTY OF THE P |     | . RECORDER, ELECTRONICS   |
| 12 LB  SENSITY REPRESENTED: 12 LB  SENSITY REPRESENTED: 12 LB  SENSITY REPRESENTED: 13 STATEMENT REPRESENTED  SENSITY REPRESENTED: 15 STATEMENT REPRESENTED  SENSITY REPRESENTED: 15 STATEMENT REPRESENTED REPRESENTED  SENSITY RECORDERANTS  SENSITY REPRESENTED TO GRAPH AND THE SENSITY REPRESENTED TO THE SENSITY REPRESENTED TO SENSITY  | _   | WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDBY POWER 52. PEAK POWER 53.  |
| SENSITYEE  SENSITY  SENS | 턴   | 12 LB 4 WATTS 12  |
| SENSITIVE RESIDENTIFY  2. MEAS. EACH 360 DEG SCAN DELAYED AND REALTINE NIGHTSIDE OF ORBIT  2. MEAS. EACH 360 DEG SCAN DELAYED AND REALTINE NIGHTSIDE OF ORBIT  2. MEAS. EACH 360 DEG SCAN DELAYED AND REALTINE NIGHTSIDE OF ORBIT  THE AC SIGNAL IS RECTIFIED, RESULTING IN A DC OUTUPT VARYING  FROM O TO —6 VOLTS AND HAVING A VIDEO BANDWIDTH OF 280 HZ.  62 ADVANTAGES AND LIMITATIONS  IN PROVED SHIELDING REDUCED BF INTERPERENCE ON DATA WHEN APT 4AS  OPREATING. USEPUL DATA ONLY DURING NIGHT.  64 REFERENCES  1) NIMBUS 2 USER'S GUIDE. GSPC, JULY 1966.***2) SIG ACHIEV IN  SPACE APP 1966. NASA SPP-166, 1967.***3) GOLBERG N. IL., THETPOHOLOGINS PRO  IN STRUMBYS POR SATELLITES. PRESENTED AT ANNHAL TER SYRD  OF SOC PHOTO-OPTICAL REGR., AUG 23, 1968.***4) OBSERVATIONS PRO  NIMBUS 1 MET SAT. NASA SP-89, 1965.***5) HRIR DATA AVAILABLE  105. HISTORICAL REMARKS  105. ALSO PLON ON NIMBUS 1, 3, HODIFIED VERSION WILL FLY ON NIMBUS  106. DIAGRAMS  | _   | INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE  |
| 2. MEAS EACH 360 DEG SCAN DELAYED AND REALTIME NIGHTSIDE OF ORBIT 22. TELEMETRY RECUIREMENTS THE AC SIGNAL IS RECTIFIED, RESULTING IN NUCLTY VARYING FROM 0 TO —6 VOLTS AND HAVING A VIDEO BANDWIDTH OF 280 HZ. 52. ADVANTAGES AND LUMITATIONS IMPROVED SHIELDING REDUCED RF INTERFERENCE ON DATA WHEN APT HAS OPPRATIGG. USEWIL DATA ONLY DIRING NIGHT.  1) NIMBUS 2 USER'S GUIDE. GSPC, JULY 1966.***2) SIG ACHIEV IN SPACE APP 1966. NASA SP-156, 1967.***3) GOLBERG, I.L.: METROROLDG INSTRUMENTS POR SATELLITES. PRESENTED AT 13TH ANNUAL TECH SYMP OF SOC PHOTO—OPTICAL RUGR., AUG 23, 1968.***4) OBSREVATIONS PRO NIKBUS 1 MET SAT. NASA SP-89, 1965.***5) HRIR DATA AVAILABLE SS. HSTORICH REMARS ALSO FLURN ON NIMBUS 1, 3, MODIFIED VERSION HILL FLY ON NIMBUS OB DIAGRAMS   | -,- | ENSITIVE   SENSITIVE RF SH  |
| THE AC SIGNAL IS RECTIFIED, RESULTING IN A DC OUTPUT VARYING FROM OF O'-6 VOLTS AND HAVING A VIDEO BANDWIDTH OF 280 HZ.  SA ADVANTAGES AND LIMITATIONS  IN PROVED SHIELDING REDUCED RF INTERFERENCE ON DATA WHEN APT HAS OPERATING:  SA REFERENCES  IN INTERNETS  SPACE APP 1966. NASA SP-156, 1967.***3) GOLDERG, IL.: METEOROLOGO OF SOC PHOTO-OPTICAL ENGR., AUG 23, 1968.***4) GOLDERG, IL.: METEOROLOGO OF SOC PHOTO-OPTICAL ENGR., AUG 23, 1965.***5) HORR ANNIAL TECH SYMP ON SOC PHOTO-OPTICAL ENGR., AUG 23, 1965.****5) HORR DATA, GODE 650, NASA SP-25) HORR DATA AVAILABLE PROM: NIMBUS DATA, GODE 650, NASA SPACE SCIENCE CTR, GSPC.  ALSO PLOYN ON NIMBUS 1, 3, MODIFIED VERSION WILL PLY ON NIMBUS OF DIAGRAMS  ALSO PLOYN ON NIMBUS 1, 3, MODIFIED VERSION WILL PLY ON NIMBUS  |     | SETTINGS ONE CHATTAG NECK DEC CAS HOLD AGAIN  |
| THE AC SIGNAL IS RECTIFIED, RESULTING IN A DC OUTPUT VARYING FROM O TO -6 VOLTS AND HAVING A VIDEO BANDWIDTH OF 280 HZ.  THENDVAP OF STREET STREET OF STREET STREET STREET OF STREET STR | 77  |   |
| SADVANTAGES AND LIMITATIONS  SA ADVANTAGES AND LIMITATIONS  IN TROUVE DESCRIPTION REDUCED RF INTERFERENCE ON DATA WHEN APT WAS INTROVED SHIELDING REDUCED RF INTERFERENCE ON DATA WHEN APT WAS UPPER, GUIDE, GSPC, JULY 1966.***2) SIG ACHIEV IN SPACE APP 1966. NASA SP-156, 1967.***3) GOLBERG, I.L.: METRONOGY INSTRUMENTS POR SATELITES. PRESENTED AT 13TH ANNUAL TECH SYMPORY INTROS. INTERS. AUG 23, 1968.***4) OBSERVATIONS PRO PROM: NIMBUS DATA, CODE 650, NASA SPACE SCIENCE, CIR, GSPC.  SE HISTORICAL REMARKS  ALSO PLON ON NIMBUS 1, 3, MODIFIED VERSION WILL PLY ON NIMBUS.  SE DIAGRAMS  WAS DIAGRAMS  SE DIAGRAMS  WAS DIA |     | C SIGNAL IS RECTIFIED, RESULTING  |
| THE ROUPE OF SHELDING REDUCED RF INTERFERENCE ON DATA WHEN APT WAS DEPRAYING; USERIL DATA ONLY DIRING NIGHT.  OPERATING; USER'S GUIDE. GSPC, JULY 1966.***2) SIG ACHIEV IN SPACE APP 1966. WASA SP-156, 1967.***3) GOLBERG, I.L.: METROROLOG IN STRUMENTS POR SAFELITES. PRESENTED AT 13TH ANNUAL TECH SYMP OF SOC PHOTO-OPTICAL ENGR., AUG 23, 1968.***4) OBSERVATIONS PRO IN BUSS. I WES SAFE, SP-89, 1965.***5) HRIR DATA AVAILABLE SENDMENT NIMBUS ALS SP-89, 1965.***5) HRIR DATA AVAILABLE OS. HISTORICAL REWARKS  ALSO PLOHN ON NIMBUS 1, 3, MODIFIED VERSION WILL PLY ON NIMBUS.  OF DIAGRAMS.   | _   | O TO CONTRACT OF THE CONTRACT |
| IMPROVED SHIELDING REDUCED RF INTERFERENCE ON DATA WHEN APT 4AS OPPRATING: USERIL DATA ONLY DURING NIGHT.  64 REFRENCES 1) NIMBUS 2 USER*S GUIDE. GSPC, JULY 1966.***2) SIG ACHIEV IN SPACE APP 1966. NASA SP-156, 1967.***3) GOLBERG, I.L.:METEOROLOG INSTRUMENTS POR SATELLITES. PRESENTED AT 13TH ANNUAL TECH SYMPOF SOC PHOTO-OPPICAL ENGR., MGG 23, 1968.***4) ONSERVATIONS PRO NIMBUS 1 MET SAT. NASA SP-89, 1965.***5) HRIR DATA AVAILABLE STRONG. NIMBUS 1 MET SAT. ASA SP-89, 1965.***5) HRIR DATA AVAILABLE STRONG. NIMBUS 1, 3, MODIFIED VERSION WILL PLY ON NIMBUS OF DIAGRAMS   | _   | 63. ADVANTAGES AND LIMITATIONS  |
| 64. REFERENCES  1) NIMBUS 2 USER'S GUIDE. GSPC, JULY 1966.***2) SIG ACHIEV IN SPACE APP 1966. NASA SP-156, 1967.***3) GOLBERG, I.L.: WETPOROLOG INSTRUMENTS POR STELLITES. PRESENTED AT 13TH ANNUAL TECH SYMP OF SOC PHOTO-OPTICAL ENGR., AUG 23, 1968.***4) OBSERVATIONS PRO NIMBUS 1 MET SAT. NASA SP-89, 1965.***5) HRIR DATA AVAILABLE PROM: NIMBUS DATA, CODE 650, NASA SPACE SCIENCE CIR., GSFC.  65. HISTORICAL REMARKS ALSO FLOHN ON NIMBUS 1, 3, MODIFIED VERSION HILL PLY ON NIMBUS.  65. DIAGRAMS   |     | SHIELDING REDUCED RP INTERFERENCE ON DATA WHEN APT  |
| 1) NIMBUS 2 USER'S GUIDE, GSPC, JULY 1966.***2) SIG ACHIEV IN SPACE APP 1966. NASA SP-156, 1967.***3) GOLBERG, I.L.: METEOROLOG INSTRUMENTS POR SATELLITES. PRESENTED AT 13TH ANNUAL TECH SYMP OF SOC PHOTO-OPTICAL ENGR., AUG 23, 1968.***4) OBSERVATIONS PRO NIMBUS 1 MET SAT. NASA SP-89, 1965.***5) HRIR DATA AVAILABLE PROM: NIMBUS DATA, CODE 650, NASA SPACE SCIENCE CIR, GSFC.  ALSO PLOWN ON NIMBUS 1, 3, MODIFIED VERSION WILL FLY ON NIMBUS os DIAGRAMS  ALSO PLOWN ON NIMBUS 1, 3, MODIFIED VERSION WILL FLY ON NIMBUS   |     |   |
| INTRUMENTS POR NASA SETION INCOMENCE INTERCHOLOUS INTRUMENTS POR STELLIES. PRESENTED AT 13TH ANNUAL TECH SYMP OF SOC PHOTO-OPTICAL ENGR., AUG 23, 1968.****#################################   |     | 1) NIMBUS 2 USER'S GUIDE, GSPC, JULY 1966.***2) SIG ACHIEV IN   |
| OF SOC PHOTO-OPTICAL ENGR., AUG 23, 1968.***4) OBSERVATIONS PRO NINBUS 1 NET SAT. NASA SP-89, 1965.***5) HRIR DATA AVAILABLE PROM. NIMBUS DATA, CODE 650, NASA SPACE SCIENCE CIR, GSPC.  ALSO PLOWN ON NIMBUS 1, 3, MODIFIED VERSION WILL PLY ON NIMBUS SE DIAGRAMS  |     | DERACE ARE 1900. NADA DE 1909, 1907. FFFFO COLDENG, I.L BELDONOLDON INVESTMENTS POR SAPELLIPES, DRESENTED AT 13TH ANNIAL TECH SYMD  |
| NIMBUS 1 MET SAT. NASA SP-89, 1965.***5) HRIR DATA AVAILABLE PROM: NIMBUS DATA, CODE 650, NASA SPACE SCIENCE CIR, GSFC.  ALSO PLOWN ON NIMBUS 1, 3, MODIFIED VERSION WILL FLY ON NIMBUS 68 DIAGRAMS  | ,   | AUG 23, 1968, ** #4) OBSERVATIONS   |
| 65. HISTORICAL REMARKS  ALSO FLORN ON NIMBUS. 1, 3, MODIFIED VERSION HILL FLY ON NIMBUS.  SE DIAGRAMS  OF DIA |     | (BUS 1 MEI SAT. NASA SP-89, 1965.***5) HRIR DATA  |
| SE DIAGRAMS  SE DIAGRAMS  SE DIAGRAMS  |     | TA, CUDE BOU, MASA SPACE SCIENCE CLES   |
| 9  |     | LSO PLOWN ON NIMBUS 1, 3, MODIFIED VERSION WILL PLY ON NIMBUS   |
|  |     | DE DIACHAMS   |
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| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | 38. SPECTRAL RANGE         36. SPECTRAL RESOLUTION         33. TIME CONSTANT           38. FIELD OF VIEW         39. GROUND SWATH         39. GROUND SWATH |
|--|--|
| 1, TITLE 2. ACRONYM 3. EXP NO  | 40 ANGULAR RESOLUTIONALL SPATIAL RESOLUTION  |
| ESOLUTION INFRARED RADIOMETER MRIR   | 2.8 DEG 29 NM FROM 600 NM ALTITUDE   |
| (TITLE CONT.) 4. RESUME 5. VERSON 1.1 1.1 1.1 1.1 1.1 1.1 0.0 0.0 0.0 0.0  | 42, POINTING ACCURACY 43, POINTING RATE 44, ALTITUDE 45, INCLINATION MPD CIDCUIT 30 CITN_CYNCH PPTROCES 1  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | מיינים מיינים מיינים   |
| . GODDARD SPACE FLT CENTER   |  |
| 9, CO-INVESTIGATOR 10. ORGANIZATION (11. TELEPHONE   | 47. COMPONENTS DA ATAMBRED ST PCHEDANTCE   |
| 12 CONTRACT 13 CONTRACT NUMBER 14 FLASH INDEX NUMBER 15 START 16 CONTRACT NUMBER 15 DATE 18 CONTRACT STATUS  | TRADIUME IE N. ELECTRUNICS  148. WEIGHT 149. VOLUME 50. AVERAGE POWER 81. STANDBY FOWER 52. PEAK POWER 53. MTBF  |
|  |  |
| 19. AGENCY 20. PGM OFFICE  | 84. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SMIELDING  |
| 22 VENDOR : 24 LOCATION   DSSA/SKN 202-902-009   22 LEAD TIME  | 55. CALIBRATION 81. FREQUENCY OF OBSERVATIO  |
| BARBARA RES CTR GOLETA, CALIFORNIA 05/66 NA  | E AND HOUSING DELAYED TELEMETRY  |
| RADIOMETER, 5-CHANNEL MEDIUM-RESOLUTION IR/VISIBLE SCANNING GNC  | ANALOG SIGNALS ARE SAMPLED 33-1/3 TIMES PER SEC AND CONVERTED TO   |
| 29. SPACECRAFT   | EACH DATA WORD BIT IS THEN RECORDED ON TAP   |
| MET, ERSP.   |  |
| DETREBUY-FO WEASILE RY POTEOMACNETT BADIATION PATETION DE-   | 63. ADVANTAGES AND LIMITATIONS THE DROWN SEPECTABLE OPSOCIATE AND AN IN-PITCHE CALIBORATION OF MED   |
| SPHERE IN 5 SELECT   | AND AN IN-FLIGHT CALIBRATION OF ACCURACY OF DATA OVER TIROS MRR.   |
| LENGTH INTERVALS. PARAMETERS TO BE STUDIED ARE: ATMOSPHERIC  |  |
| NATER VAPOR ABSORPTION BAND; SURPACE OR NEAR-SURPACE TEMPERATURE   | 1) NIMBUS 2 USER'S GUIDE, GSPC, JUL.66.***2) DATA CATALOG OF SAT   |
| D.   | ELLIE AND MOUNET EXPERIENTS, NASA/GSFC, NATIONAL SPACE SCI<br>  DATA CTR, REPORT NO, NSSDC 68-01, JAN 68.***3) STG ACHTRY IN                               |
|  | 1967.**#4)   |
|  | MENTS FOR SATELLITES., NASA/GSFC, AUG.68.***5) DATA AVAILABLE  |
| MAS SIMILAR IN PURPOSE TO THE EARLIER TIROS BRR BUT MAS A NEW  | FROM NATIONAL SPACE SCIENCE DATA CENTER, NASA/GSPC.  |
| INSTRUCTOR UBSIGNATES SECTION INTERVALS WERE: 0.4-0.9, IU-11, I4-14-14-30-30-0.4 ND 0.2-4.0 MICRONS. THE RADIANT ENERGY FROM THE   | SINILAR IN PURPOSE TO BARLIER TIROS MAR. RIT NEW DRSIEN.   |
| EARTH IS COLLECTED BY A FLAT SCANNING MIRROR INCLINED AT 45 DEG  | 66. DIAGRAMS   |
| TO THE OPTICAL AXIS. THE MIRROR ROTATES AT 8 RPM AND SCANS IN A  |  |
| PERPENDICULAR TO THE DIRECTIO  |  |
| TITE. EACH OF THE 5 CHANNELS CONTAINS A 1./ IN. DIAMETER FOLDED  |  |
| TION OF THE IR CHANNELS OCCUR AT 2 POINTS DURING EACH SCAN, COLD   |  |
| SPACE AND THE RADIOMETER HOUSING. THE INCIDENT PLUX POCUSED ON   |  |
| AT   |  |
| THEFER TO PRODUCE AN A.C. SIGNAL FROM THE DETECTOR, (REFERENCE TEMP OF THE PARTOR TO DETECTOR TO DETEC |  |
| TERMINED BY INTRODUCING AN ELECTRONIC VOLTAGE IN SUCH A PROPOR-  |  |
| TION THAT A TARGET OF A GIVEN TEMP WILL ALWAYS PRODUCE THE SAME  |  |
| ABSOLUTE VOLTAGE OUTPUT. THE ELECTRICAL SIGNAL PROM THE DETECTOR   |  |
| ANALOG OUTDUT OF O TO -6. U VOITS TO COVER THE DESIRED BANGE OF  |  |
| RE POR EACH CHANNEL.   |  |
| 32. PHENOMERA DESERVED.  |  |
| RADIATION FROM THE BARTH AND ITS ATMOSPHERE (33 MEASUREMENT RANGE  |  |
|  |  |
| PRECISION AND ACCURACY   |  |
| A S/N RATIO OF BETTER THAN 30 DB; ABSOLUTE ACCURACY OF +-3 DEG C   |  |
|  |  |

SI.FREQUENCY OF OBSERVATION

| THEROUGES AND LIMITATIONS  THEROUGED SPECTRAL RESPONSE AND AN IN-FLIGHT CALIBRATION OF THE SIGNAL LEVEL HAS INCREASED ACCURACY OF DATA OVER TIROS MRR.  THENE AND ROCKET EXPERIENTS. NSA/GSPC, ANTIONAL SPACE SCI LILITE AND ROCKET EXPERIENTS. NSA/GSPC, ANTIONAL SPACE SCI ATA CTR. REPORT NO. NSSDC 68-01, JAN 68.***5) DATA ATHEUR IN PRACE APP. NASA SP-156, 1967.***44) GOLDBERG, I.L.: HET IN INSTRU-RENTS FOR SATELLITES., NASA/GSPC, AUG.68.***5) DATA AVAILABLE ROM NATIONAL SPACE SCIENCE DATA CENTER, NASA/GSPC, AUG.68.***5) DATA AVAILABLE SHOM NATIONAL SPACE SCIENCE DATA CENTER, NASA/GSPC, AUG.68.***5) DATA AVAILABLE SHOM NATIONAL SPACE TO EARLIER TIROS MRR, BUT NEW DESIGN.  LONGRAMS  LONGRAMS | ADVANTAGES AND LIMITATIONS  WERD VED SPECTRAL RESPONSE AND AN IN-PLICHT CALIBRATION OF THE MENOVED SPECTRAL RESPONSE AND AN IN-PLICHT CALIBRATION OF THE MENOVED SPECTRAL RESPONSE SED ACCURACY OF DATA OVER TIROS HRR. REFERENCES  INTROUGH STATE CTR, NASA/GSPC, JOL.66.***2) DATA CATALOG OF LITTE AND ROCKET EXPERINENTS. NASA/GSPC, NATIONAL SPACE SCIENCE 68-01, JAN 68.***3) SIG ACHIEV IN ATLONAL SPACE SCIENCE DATA CENTER, NASA/GSPC, ANG.68.***5) DATA AVILABLE ON SATELITES., NASA/GSPC, ANG.68.***5) DATA AVILABLE ON SATELITES. NASA/GSPC, NASA/GSPC, ANG.68.***5) DATA AVILABLE ON SATELITES. NASA/GSPC, NAS | ANALOG SIGNALS ARE SAMPLED 33-1/3 TIMES PER SEC AND CONVERTED TO 7-BIT DIGITAL DATA. EACH DATA WORD BIT IS THEN RECORDED ON TAPE FOR PLAYBACK. |
|--|--|--|
| HEROUED SPECTRAL RESPONSE AND AN IN-FLIGHT CALIBRATION OF TREASE LEVEL HAS INCREASED ACCURACY OF DATA OVER TIROS HRR.  REFERENCES  NIMBUS 2 USER'S GUIDE. GSPC, JDI.66.***2) DATA CATALOG OF LLITE AND ROCKET EXPERIMENTS. NASA/GSPC, NATIONAL SPACE SCI ATA CTR, REPORT NO. NSSDC 68-01, JAN 68.***3) SIG ACHIEV INS ACE APP.NSS SP-156, 1967.***4, GOLDBERG, I.L.: MET IR INS RNTS POR SATELITES. NASA/S*PC, AUG.68.***5) DATA AVILABL ON NATIONAL SPACE SCIENCE DATA CENTER, NASA/GSPC, HISTORICAL REMARKS  IMILAR IN PURPOSE TO EARLIER TIROS NRR, BUT NEW DESIGN.  DIAGRAMS  OLAGRAMS   | HEROVED SPECTRAL RESPONSE AND AN IN-FLIGHT CALIBRATION OF TREATLY LEVEL HAS INCREASED ACCURACY OF DATA OVER TIROS HRR.  REFERENCES  INTRODUCE STATEMENTS. NASA/GSPC, NATIONAL SPACE SCINATA CTR, REPORT NO. NSSDC 68-01, JAN 68,****3) SIG ACHIEV IN SACE APP. NASA SSPC, NATIONAL SPACE SCINCE APP. NASA SSPC, NASA/GSPC, NASA SSPC, NASA/GSPC, NASA | 63. ADVANTAGES AND LIMITATIONS   |
| REFERENCES  NIMBUS 2 USER'S GUIDE, GSPC, JUL.66.***2) DATA CATALOG OP LITTE AND ROCKET EXPERIBENTS. NASA/GSPC, NATIONAL SPACE SCI ATA CTR, REPORT NO. NSSDC 68-01, JAN 68,***3) SIG ACHIEV IN PACE APP.NASA SP-156, 1967.***4, GOLDBERG, I.L.: MET IR INS BUT POR SATELLITES., NASA/GSPC, AUG.68.***5) DATA AVAILABL HISTORICAL REMARKS  LHILAR IN PURPOSE TO EARLIER TIROS MRR, BUT NEW DESIGN.   | REFERENCES  NIMBUS 2 USER'S GUIDE, GSPC, JUL.66.***2) DATA CATALOG OP  LITE AND BOCKET EXPERIBENTS. NASA/GSPC, NATIONAL SPACE SCI  ACTR REPORT NO. NSSDC 68-01, JAN 68,***3) SIG ACHIEV IN  PACE APP.NASA SP-156, 1967.***4, GOLDBERG, I.L.: MET IR INSIGNS FOR SATELLITES., NASA/GSPC, AUG.68.***5) DATA AVAILABL  HISTORICAL FRANCES  LMILAR IN PURPOSE TO EARLIER TIROS MRR, BUT NEW DESIGN.  OLAGRAMS  | MPROVED SPECTRAL RESPONSE AND AN IN-PLIGHT CALIBRATION OF IGNAL LEVEL HAS INCREASED ACCHRACY OF DATA OVER TIRGS MRR.                           |
| 15 2 USER'S GUIDE, GSPC, JUL.66.***2) DATA CATALOG OP IND ROCKET EXPERIENTS. NASA/GSPC, NATIONAL SPACE SCI NEDORT NO. NSSDC 68-01, JAN 68.***3) SIG ACHIEV IN P. NASA SP-156, 1967.***4, GOLDBERG, I.L.: MET IR INSIN SATELLITES., NASA/GSPC, AUG.68.***5) DATA AVAILABL I PONAL SPACE SCIENCE DATA CENTER, NASA/GSPC, IN PURPOSE TO EARLIER TIROS MRR, BUT NEW DESIGN.  | LITE AND ROCKET EXPERIENCE. JOI.66.***2) DATA CATALOG OP LITE AND ROCKET EXPERIENTS. NASA/GSPC, NATIONAL SPACE SCI ACTR, REPORT NO. NSSDC 68-01, JAN 68.***3) SIG ACHIEV IN REE APP.NASA SP-156, 1967. ***44) GOLDBERG, I.L.: MET IR INSIRTS FOR SATELLITES., NASA/GSPC, AUG.68.***5) DATA AVAILABL SACE SCIENCE DATA CENTER, NASA/GSPC. HISTORICAL REMARKS LILIAR IN PURPOSE TO EARLIER TIROS MRR, BUT NEW DESIGN.  DIAGRAMS  LACTOR OF THE DESIGN.   | REFERENCES   |
| ALLITE AND ROCKET EXPERIBENTS, NAS ATA CTR, REPORT NO. NSSDC 68-01, ACE APP.NASA SP-156, 1967.****#  SUTS FOR SATELLITES., NASA/GSPC, ROM NATIONAL SPACE SCIENCE DATA C HISTORICAL REMARKS  LIMIAR IN PURPOSE TO EARLIER TIRO DIAGRAMS   | ALLITE AND ROCKET EXPERIBENTS, NAS ATA CTR, REPORT NO. NSSOC 68-01, AACE APP.NASA SP-156, 1967.*****#  RACE APP.NASA SP-156, 1967.*****#  RACE APP.NASA SP-156, NASA/GSPC, NATIONAL SPACE SCIENCE DATA CHISTORICAL REMARKS  INTIGATION PURPOSE TO EARLIER TIRO DIAGRAMS  LIMILAR IN PURPOSE TO EARLIER TIRO DIAGRAMS   | NIMBUS 2 USER'S GUIDE. GSPC, JOL. 66. ** * 2) DATA CATALOG OF  |
| ALCE APP.NASA SP-156, 1967, ***##################################  | ALCE APP.NASA SP-156, 1967, ****#################################  | ROCKET EXPERIMENTS, NASA/GSPC, NATIONAL SPACE  |
| ENTS FOR SATELITES., NASA/GSPC, SOM NATIONAL SPACE SCIENCE DATA CHISTORICAL REMARKS INTIAN IN PURPOSE TO EARLIER TIRO  | ENTS FOR SATELITES., NASA/GSPC, AOM NATIONAL SPACE SCIENCE DATA CHISTORICAL REMARKS LHILAR IN PURPOSE TO EARLIER TIRO  | APP NACA CD-156 1967 ***   |
| HON NATIONAL SPACE SCIENCE DATA CENTER. HISTORICAL REMARKS CINCIANS IN PURPOSE TO EARLIER TIROS MRR.   | HON NATIONAL SPACE SCIENCE DATA CENTER. HISTORICAL REMARKS GIAGRAMS DIAGRAMS TO EARLIER TIROS MRR.   | FOR SATELLITES., NASA/GSPC,  |
| DIAGRAMS  OLAGRAMS  TO EARLIER TIROS ARE,  | DIAGRAMS TO EARLIER TIROS ARRADIANS  | PACE SCIENCE DATA CENTER, NASA   |
|  |  | INILAR IN PURPOSE TO EARLIER TIROS MRR.  |
|  |  |  |

NIMBUS 3

|   | INSTRUMENT RESUME  | Œ I                    |
|---|--|------------------------|
| NATIONAL  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS     | 38. PIELD OF VIEV      |
| 1. TITLE  |  | 40.ANC                 |
| HIGH-RESOLUTION INFRARED RADIONETER (TITLE CONT.)                   | 9  | V 42, POINTING ACCURAC |
|   |  |                        |
| NVESTIGATOR   |  | 46. SPECIAL REGU       |
| CHERRIX, G.T. GC.   | GODDARD SPACE FLT CENTER 301-982-5754 10. ORGANIZATION   | 47, COMPONENTS         |
|   | ODDARD SPACE FLT CRNTER 301-982  | RADIOMETER             |
| 3. CONTRACT NUMBE   | 14. FLASH INDEX NUMBER 15. DATE 16. CONTENT TO STATUS  | 48. WEIGHT             |
| 18. MONITOR   | 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 54. INTERFE            |
| SCHARDT, B. B. NI   | NASA HDOTRS   OSSA/SRN 202-962-0891  | 100 es                 |
| ITT INDUSTRIAL LABS   | NE, INDIANA 04/69 NA   | 7                      |
| RADIOMETER, DUAL-CHANNEL  | INPRARED SCANNI  |                        |
| 28. APPLICATION   |  |                        |
| MET, ERSP   | NIMBUS 3   |                        |
| DETMARY-TO PROVIDE BOTH DAYTIME CLOUD                               | H DAYTIME CLOUD MAPPING AND NIGHTHIME  | THIS HRIR              |
| RADIATION MEASUREMENTS ON A FULL                                    | BASIS.   |                        |
| PROVIDE THIS INPORMATION<br>THE WORLD AS THE NIMBUS                 | INFORMATION TO APT STATIONS IN REALTIME ANYWHERE THE NIMBUS 3 PASSES OVERHEAD.                               | IN 64. REFERENCES      |
|   |  | SENTED AT              |
| 31. PRINCIPLES OF OPERATION   |  | ***3) NIMBU            |
| A SINGLE-CHANNEL SCANNING HRIR WAS FLOWN                            | ON NIMBUS 1 AND  | NIMBUS B               |
| MUDIFIED VERSION IS SCH<br>WILL PROVIDE DATA IN 2                   | SPECTRAL   | 65. HISTORICAL F       |
| ICRONS)   | TOP. OR SURPACE TEMPERATURES A   | SINGLE-CHA             |
| IN PREVIOUS HRIR'S. THROUGH THE<br>DAVTIME DATA (0.7 TO 1.3 MICHONS | USE OF A DUAL BAND-PASS FILTER<br>N WILL DRIMARILY DROVIDE MADS  | DA DIACHAMS            |
| COVER   | E REFLECTED SOLAR RADIATION. T   | . 60                   |
| HRIR SENSES RADIATION I   | RADIATION WITH A LEAD SELENIDE PHOTO-CONDUCTIVE CELL   |                        |
| INCLINED 45 DEG TO THE  | US DEG TO THE AXIS OF ROTATION AND CONTINUOUSLY ROTATES  |                        |
| THE FOV OF THE DETECTOR   | OF THE DETECTOR THROUGH 360 DEG AT A RATE OF 48 RPM, I<br>NOBMAL TO THE SDACFCRAPH VELOCITY. THE VIEW OF THE |                        |
| HOUSING AND SPACE DURING  | E ZERO AND W   |                        |
| CALIBRATION POINTS. TH  | CALIBRATION POINTS. THE RADIATION REPLECTED FROM THE SCAN MIR-   |                        |
| ROR IS CHOPPED AT 1.5 C<br>CASSEGRAINTAN TELESCOPE                  | AT THE DETECTOR  | BY                     |
|   | N THEM. THE OUTPUT SIGNAL  |                        |
| HAS AN INFORMATION BANI<br>STORED ON TAPE FOR PLAY                  | BANDWIDTH OF 350 HZ. THIS INPORMATION IS<br>PLAYBACK ON COMMAND OR CAN BE TRANSMITTED                        |                        |
| Y TO APT GRO  | STATI  |                        |
| TITED CLOUD-TOP AND   | SURPACE RADIATION DURING NIGHT AND DAY   | -(-1                   |
| 33. MEASUREMENT RANGE   | 4  |                        |
| RADIANT TEMPERATURE BET<br>34 PRECISION AND ACCURACY                | BETWEEN 210 AND 330 DEG K.   |                        |
| CLOUD-TOP ALTITUDE TO   | TO 1000 PT; SURPACE TEMP TO APPROX 1 C DEG   |                        |
|   |  |                        |

| 36 SPECTRAL RANGE 36 SPECTRAL RESOLUTION 37. TIME CONSTANT , 0.7 TO 4.2 MICRONS  |
|--|
| 38. FIELDOF VIEW 38. GROUND SWATH 90. BY 0.5 DEG 1300 NH BY 5 NH FROH 600 NH ALTITUDE  |
| PROM 600 NM ALTITUDE   |
| 46. SPECIAL REQUIREMENTS TAKE SUN-SINCH RETROGRADE   |
| A. COMPONENTS  |
| KADLORETER, ELECTRONICS 48 WEIGHT 49, VOLUME 50, AVERAGE FOWER 51, STANDBY FOWER 52, PEAK FOWER 53, MT8F   |
| 18 LB NAGNETIC BULL NUCLEAUE ST. INTERFERENCE ST. INTERFE |
|  |
| MEAS BACH 360 DEG SCAN DELAYED AND REALTING  |
| VIDEO INFORMATION BANDWIDTH IS 350 HZ.   |
|  |
| ∢ i  |
| ONES COULD NOT BULLIU PARTS  |
| STRUMENTS FOR SATELLITES.  |
| PRESS KIT, NO. 68-84K, NASA MAY 10,  |
| JULY   |
| 4. MARCH, 1968.<br>65. HISTORICAL REMARKS  |
| SINGLE-CHANNEL HRIR HAS FLORN ON NIMBUS 1 AND 2.   |
| 66. DIAGRAMS   |
|  |
|  |
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|  |
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| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS                             | 35. SPECTRAL RESOLUTION         37. TIME CONSTANT           0.4         TO         0.7         MICRON           38. FIELD OF VIEW         39. GROUND SWATH         59. GROUND SWATH           92.0         BY         92.0         DEG   1300 NM BY 1300 NM FROM 606 NM ALTITUDE |
|--|--|
| SSECTOR CAMERA SYSTEM IDCS   | CENTER PROM 600 NM ALTITUDE  |
| (TITLE CONT.) 4. MENUM 5. VARGON 11/10/69  0004  | 12. POINTING ACCURACY   42. POINTING RATE 14. ALTITUDE 15. INCLINATION   RETROGRADE   MED CIRCULAR SUN-SYNCH RETROGRADE  |
| 8. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE REPRINCEPED C COND. PD CDA.C. P. T. C. P. T. C. P. C. | TIME VOUL OF CITE BE   |
| 10. ORGANIZATION   | TO TOOK CHOOKS TOOK  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATE 16. CONTRACT NUMBER 15. STATUS   | IMAGE DISECTOR, SCANNING APERTURE, 12 STAGE ELECTRON MULTIPLIER. 48. WEIGHT 19. VOLUME 18. MYREF   |
| NAS5-9619  | 14 LB 0.2 CU PT 12 WATTS   |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE CERTAIN B. R. NASA HOOTE OSSA/CBN 202-662-0841  | G4. INTERFERENCE ISS. INTERFERENCE ISG. INTERFERENCE 57. INTERFERENCE 58. SHIELDING CALIDO CARN  |
| 29 LOCATION  |  |
| ITT INDUSTRIAL LABS FORT WAYNE, INDIANA 04/69 NA 28. INSTRUMENT TYPE   | 62 TELEMETRY REQUIREMENTS  |
| CH PROTOCATHODE ELECTRICALLY-SCANNING VISIBLE  | VIDEO BANDWIDTH IS 1800 HZ.  |
|  |  |
|  |  |
| PRIMARY-TO ACQUIRE HIGH-RESOLUTION PHOTOGRAPHS OF THE EARTH'S DAYTHE CLOID COVER.  | REPLACES AVCS AND APT CAMERAS FLOWN ON NIMBUS 1 AND 2; REDUCES NIMBER OF DICTURES TO ONE-SIXTH DEPUTOUS AMOUNT.  |
|  |  |
|  | 1) NORMYLE, W.J.: NIMBUS B TO TEST NEW WEATHER SENSORS, IN<br>AVIATION WEEK AND SPACE TECHNOLOGY, MAY 6. 1968. PP. 71-69.***2)   |
|  | KIT NIMBUS B, NASA RELEASE NO.   |
|  | TROW, H. AND O. WEINSTEIN; A REVIEW OF A DECADE OF SPACE CAMERA  |
| IT REQUIRED BOTH AN AVCS AND AN APT. IT HAS ALSO FLOWN ON AIS 3,   | PRESENTED AT SOCIETY<br>SRS. WASH, D.C., AUG 1   |
| DULED FOR NIMBUS D. A  | 65. HISTORICAL REMARKS   |
| SCENE IS OPTICALLY POCUSED ON THE PHOTOCATHODE AND PHOTOELECTRONS ARE ENTITED PROM THE SIRPACE IN DRODORTION TO THE INCIDENT                     | REPLACES AVCS PLUS APT. PLOWN ON ATS 3. SCHEDULED FOR NIMBUS D. 168 DIAGRAMS   |
| SCTRONS ARE  |  |
| POCUSED ON A PLANE WHICH CONTAINS A PINHOLE APERTURE AT ITS CEN-<br>TER. THE RIECTRON THACK IS DREIDCHED DAST THE APPRINCE BY MEANS              |  |
| SAMPLES THE ELECTRON   |  |
| AND A SECONDARY-EMISSION ELECTRON-MULTIPLIER SECTION AMPLIPIES   |  |
| SCAN HODE WITH THE SPACECRAFT NOTION ALONG THE ORBITAL TRACK   |  |
| PROVIDING THE OTHER SCAN COMPONENT. NO SHUTTER IS REQUIRED AS  |  |
| (1800 HZ)  |  |
| THE HIGH   |  |
| THE CARENA-LINE FREQUENCY IS 4 HZ WITH THE FRAME PERIOD BEING 200 SEC. THE LENS APERTURE IS FIXED AT P/3. THE GROUND RESOLG-                     | •  |
| TION IS 1.7 NM AT THE SUBSATELLITE POINT. REALTIME PICTURES CAN BE TRANSMITTED TO ADT RECRIVING STATIONS.  |  |
| 32. PHENOMENA OBSERVED   |  |
| VISIBLE LIGHT REPLECTED PROM EARTH AND ITS CLOUD COVER 33 MEASUREMENT PANGE  |  |
| 100 TO 10,000 FOOT-LAMBERTS  |  |
| 800 TV LINE RESOLUTION; S/N = 40 DB AT 10,000 FOOT-LAMBERTS  |  |
|  |  |

| IN STRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS               | 38. SPECTRAL RANGE  38. SPECTRAL RESOLUTION 37. TIME CONSTANT  38. FIELD OF VIEW  39. SPECTRAL RESOLUTION 37. TIME CONSTANT  38. FIELD OF VIEW  R. O  DRG 80 NM DTAM CIPCTR PROM CON MA ATTENTION  |
|---|--|
| 1. TUTLE 2. ACRONYM 3. EXPINO   | 140, ANGULAR RESOLUTION 41, SPATIAL RESOLUTION   |
|   | 1777   |
| 11/10/69  | SATIONIO CAR   |
| ATOR 7. ORGANIZATION 8. TELEP   | 46, SPECIAL REQUIREMENTS   |
| HANEL, R.A. GODDARD SPACE FLT CENTER 301-982-4528 2 CO-INVESTIGATOR 10. ORGANIZATION  | IMAGE MOTION COMPENSATION REQUIRED TO ELIMINATE SMEAR  |
| 13  | ICHELSON INTERPERONETER SPECTROMETER, ROTATING MIRROR,   |
| CONTRACT NOMBER 13. PLASH INDEX NOMBER 19. DATE   |  |
| 20.PGM OFFICE 21. TELEPHO   | 54. INTERFERENCE 35. INTERFERENCE 50. INTERFERENCE 57. INTERFERENCE 58. SHIELDIN   |
| SCHARDT B. B. INASA HDOTES OSSA/SRN 202-962-0891  | 59. CALIBRATION AND DATA DECOMENT  |
| ENTRUMENTS DALLAS, TEXAS 04/69  | SEE ITEM 31 DELAYED TELEMETRY  |
| INFRARED INTERPERONETER   | -L   |
| 28. SPACECRAFT  MET , NTMR 3  |  |
| POSE  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY- TO DETERMINE THE VERTICAL PROFILE OF TEMPERATURE, THE VERTICAL DISTRUBUTIONS OF OZONE AND WATER VAPOR, AND THE TEMPER-     | ·  |
| THE EARTH'S SURFACE OR CLOUD TO   | 64. REFERENCES   |
| IDENTIFY SOME OF THE GASES PRESENT IN THE ATMOSPHERE.   | 1) MINZNER, R.A. ED: INTERIM REPORT ON SATELLITE METEOROLOGICAL INSTRUMENTS, NASA/ERC PM-6713, JUNE 1967.***2) HANEL, R.A. AND   |
| 3) PRINCIP ES DE OPERATION  | L. CHANEY: THE INPRARED INTERPEROMETER SPECTROMETER EXPERIMENT   |
| THIS IS A THYREN-CREEN MODIFICATION OF A MICHELSON INTERPREDATE.  | ASSIST A *** 3 TO SET TO TO TO TO THE MEDIT AND TODOS TO TOTOS TO TODOS TO TOTOS TO TODOS TO TODOS TO TODOS TO TODOS TO TODOS TO TODOS TO TOTOS TO TODOS TO TOTO TO |
| O 20 MICRON F   |  |
| ILOW WITH A FOY OF O DEGREES. MADIATION FROM A CILINDER OF ATHOSPHERE, WHOSE BASE ON THE EARTH'S SURPACE IS A CIPCLE HO NA          | US, FIGURE ARMARNS   |
| INST  | 66. DIAGRAMS   |
| ROB WHICH ROTATES TO PROVIDE INC. THE RADIATION IS SPLIT INTO   |  |
| COMBINED AND POCUSED ONTO A BOLOMBIER DETECTOR. INTERFERENCE  |  |
| RPPECTS RESULT PROM THE PATH LENGTH DIPPERENCES IN THE 2 BEAMS  |  |
| AS THE MIRROR MOVES. IT TRAVELS ABOUT 2 MM IN 11 SEC TO GIVE AN INDEPENDENTIONS AND DESCRIP   |  |
| . 23  |  |
| THERE IS NO OVERLAP IN SUCCESSIVE OBSERVATIONS, AFTER RECORDING   |  |
| 14 INTERFEROGRADS, Z CALIBRATION OBSERVATIONS ARE MADE, ONE POR<br>A REPERBNCE BLACKBODY AT 300 K AND ONE POR CHTER SPACE, A POHRT- |  |
| R TRANSPORMATION, PERFORMED BY DIGITAL COMPUTER, MUST B   |  |
| DUCE A SPECTRUM.  |  |
| TO RELATE THIS TO ATROSPHERIC CONDITIONS, APPROPRIATE SPECTRAL BROORDETON RECTONS MINE BY CHOSEN AND PROTOVED IN AN INVESSION       |  |
| TRANSFER EQUATIONS  |  |
| EMISSION FROM THE EARTH IN THE SPECTRAL REGION 5-20 MICRONS   |  |
| 33. MEASUREMENT RANGE   |  |
| HEAR ZERO TO 300 DEGREES KELVIN<br>34. PRECISION AND ACCURACY   |  |
| POB TEMP, 2 DEG C: FOR WATER VAPOR AND SCALE HEIGHT, 10 PER CENT  |  |

| INSTRUMENT RESUME  | AL RANGE   |
|--|--|
| NATIONAL AFRONAUTICS AND SPECE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 39.  |
|  | 40, ANGULAR RESOLUTION 41, SPATIAL RESOLUTION  |
| INTERROGATION, RECORDING, AND LOCATION SYSTEM IRLS (* PRESUME S. VINSON)   | 42. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION                   |
| 69/  | MED CIRCULAR SUN-SYNCH RETROGRADE  |
| GODDARD SPACE FLT CENTER   | RESERVANT TO PREVIOUS GROUND COMMAND FOR SENSOR INTERROGATION                          |
| THANS  | CONTONENTS. SCRIVER, TRANSMITTER, ELECTRONICS  |
| 12. TYPE 13. CONTHACT NUMBER 14. FLASH INDEX NUMBER 19. DATE 16. DATE 17. STATUS ODP/RATTONAL  | 26 T.R. O. L. CH PT 18 WATTS 107 WATTS   |
| 19. AGENCY 20.PGM OFFICE 21. TELEPHO   | 155. INTERFERENCE 30. INTERFERENCE 57. INTERFERENCE 58. SHIELD                         |
| 22 VENDOR 202-962-0891   | SOURC/SEN SENSITIVE   SENSITIVE   6. DATA RECOVERY   6. FREQUENCY OF OBSERVATION       |
| ION, INC MELBOURNE, FLORIDA 04/69 NA   | DELAYED TELEMETRY  |
| 26 INSTRUMENT TYPE REMAINS THE TRANSPONDER THE TRANSPONDER THE   | 62 TELEMETHY REQUIREMENTS 20 CHANNETS. & DICTOR AND 15 ANALOG CAMBIED REGUERN 1 AND 16 |
| 29. SPACECRAFT   |  |
| MET, OCEAN, COME, NAV, BIOL.   | ORDIZATINI I DIA AMAMATIKAN ES   |
| PRIMARY- TO DEMONSTRATE THAT A SATELLITE CAN DETERMINE THE   | 1. TM THEO AT DRESPENT TO 10 DIATPORMS   |
| POSITION OF PLATFORMS CONTAINING SENSORS, RECORD THEIR DATA, AND   | :  |
| THEN RADIO THE RESULTS TO A GROUND STATION FOR DISSEMINATION. ***  | 04. REFERENCES   |
| SECONDARY- TO PROVIDE METEOROLOGICAL AND OTHER DATA AS SENSED BY DEMOTE SPACEDS  | 1) NORMYLE, W.J.: NIMBUS B TO TEST NEW WEATHER SENSORS.                                |
| יו היוטור ליויים ליוים ליוים ליוים ליויים ליוים ליויים ליויים ליויים ליוים ליויים ליויים ליויים ליויים ליויים ליוים ליויים ליוים ליוים ליוים ליוים ליוים ליוים ליוים ליוים |  |
| 31. PRINCIPLES OF OPERATION  | NIMBUS B COMMAND AND TELEMETRY DIRECTORY, VOL. 2; EXPERIMENT                           |
| THIS INSTRUMENT IS SIMILAR TO THAT PLOWN ON NIMBUS D. IT CON-  | SUBSYSTEMS, GENERAL ELECTRIC CO., PHILADELPHIA, PA., 1967.                             |
| SISTS OF A TRANSMITTER (401.5 MHZ) WITH A VACUUM TOBE FINAL  | 65 HISTORICAL REMARKS  |
| DETECTOR, AND MEMORY (20 KBIT). THE DATA MODULES, EACH WITH A  | SIMILAR TO NIMBUS D IRLS   |
| UNIQUE ADDRESS, OF WHICH THE BALLOON INTERROGATION PACKAGE (BIP)   | 66. DIAGRAMS   |
| IS AN BYAMPLE, CONTAIN A RECEIVER (401.5 MHZ), DECODING AND COD-   |  |
| ING CIRCUITS, DATA SENSORS AND A TRANSMITTER (450 MHz). AS THE S/C PASSES WITHIN RANGE OF A COMMAND AND DATA ACCUISITION STA-  |  |
| TION (CDA) UP TO 20 COMMANDS CAN BE SENT AND STORED IN THE IRLS  |  |
| MEMORY. A COMMAND CONSISTS OF A TIME FOR AN INTERROGATION AND  |  |
| THE ADDRESS OF THE BIP (OR OTHER HODGE) TO BE CONTACTED. WHEN  |  |
| S/C IRLS TRANSMITS THE ASSOCIATED BIP ADDRESS. THE BIP RESPONDS  |  |
| AND TRANSHITS ITS SENSOR READINGS. THESE AND THE ROUND TRIP  |  |
| IRLS MEMORY. THIS PROCEDURE IS REPEATED FOR EACH STORED COMMAND  |  |
| P THE MEMORY   |  |
| THE STORAGE OF NEW COMMANDS IN THE MEMORY. KNOWING THE S/C PO-   |  |
| BE POUND TO HITHIN 2 KM.   |  |
| THE CONTRACTIONS OF THE POOR OFFICE OF THE OFFICE  |  |
| 1 NEASUREMENT RANGE  |  |
| AND IN THE PROPERTY OF THE PRO |  |
| PLATFORM INCATION TO 4-0.6 NM. DRIAY TIME TO 0.625 MICROSPOND  |  |
|  |  |

| NET PESSENT  | 38. SPECTRAL RANGE 39. SPECTRAL RESOLUTION 39. TIME CONSTANT   |
|--|--|
|  | O 23.0 MICRON  |
| CAMBRIDGE, MASSACHUSETTS   | 360.0 BY 2.8 DEG LIMB-TO-LIMB (3800 NM) FROM 600 NM ALT  |
|  | 40.ANGULAR RESOLUTION 41. SPATIAL RESOLUTION   |
| MEDIUM-RESOLUTION INFRARED RADIOMETER MRIR   | G 25 NM FROM 600 NM ALTITUDE   |
|  | AL YOUNDER ALL POINTING RAILE AS ALTHOUGH AS INCLINATION MET DOING THE STRUCK AS DESCRIPED AS THE STRUCK AS DESCRIPED AS THE STRUCK AS THE STR |
| TIGATOR 7. ORGANIZATION 8. TELEPHONE   |  |
| .W. GODDARD SPACE FLT CENTER   |  |
| B. CO-INVESTIGATION TO CHEANING IT. TELEPHONE  | 47. COMPONEN'S   |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATE 18. GATE 18. GATE 11. STATUS   | RADIOMETER, ELECTRONICS 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDSY POWER 52. PEAK POWER 53. MTBF  |
|  | 20 LB 8 WATTS 2 WATTS  |
| 19. AGENCY 20. PGM OFFICE  | 54. INTERPERENCE 55. INTERPERENCE 56. INTERPERENCE 57. INTERPERENCE 58. SHIELDING  |
| 22 VENDOR DE B.  | SO CALIBRATION IN THE PROJECT OF THE PROJECT OF OBSCOVATION  |
| A RES CTR GOLETA, CALIPORNIA 04/69 NA  | PACE AND MRIR HOUSING DELAYED TELEMETRY  |
|  |  |
| RADIOMETER, S-CHANNEL MEDIUM-RESOLUTION SCANNING IR/VISIBLE UNC  | ANALOG SIGNALS ARE SAMPLED 33-1/3 TIMES PER SEC AND CONVERTED TO   |
|  | D-BIT DIGITAL DATA, BACK DATA WORD BIT IN THEN RECORDED ON TAPE.   |
| POSE   | 03. ADVANTAGES AND LIMITATIONS   |
| SELECTED ELECTROMAGNETIC   | IMPROVED SPECTRAL RESPONSE AND IN-PLIGHT CALIBRATION HAS IN-   |
| REFLECTED FROM THE EARTH AND ITS ATMOSPHERE TO OBTAIN DATA ON  | CREASED ACCURACY OF DATA OVER TIROS MRIR: MOVING PARTS.  |
|  |  |
| TION, SURFACE OR CLOUD TEMPERATURES AND SEASONAL CHANGES OF  | 1) GOLDBERG, I.L.: METEOROLOGY INSTRUMENTS FOR SATELLITES. PRE-  |
| TEMPERATURES, *** SECONDAR.  | 25 1968 ###2)NTMBHR B DDRES KTT NO-68-80K NACA MAY 10 1968   |
| 1 1  | ***3) NIMBUS 2 USER'S GUIDE, GSFC, JULY 1966.***4) SABATINI, R.R.  |
| CHANNEL NIMBUS MRIR IS SIMILAR IN PURPOSE TO THE   | NIMBUS B DATA UTILIZATION PLAN. ALLIED RES. ASSOC, TECH REPT NO.   |
| TIBOS MRR, BUT USES AN ENTIRELY NEW INSTRUMENT DESIGN, RADIA-  | 4, MARCH 1968.   |
| TION ENTERS THE RADIOMETER BY REFLECTION PROM A PLAT SCANNING  | 65. HISTORICAL REMARKS   |
| O.   | SIMILAR IN PURPOSE TO EARLIER TIROS MRR  |
| CHOPPER MODULATES THE RADIATION AT 60 HZ. THE SPECTRAL REGIONS   | 66. DIAGRAMS   |
| ARE SELECTED BY PILTERS. FOR THIS MRIR THE REGIONS (IN MICRONS)  |  |
| ARE 6.4-6.9 FOR MATER VAPOR DISTRIBUTION IN THE TROPOSPHERE,   |  |
| CONTROL OF STREET FRANCHING A TO CLOSE TO STREET CONTROL OF STREET CONTROLS AND STREET |  |
| AND 0.2-4.0 POR ALREDO MEASUREMENTS. PARCH CHANNEL HAS A SEDARATE  |  |
| 12   |  |
| METER OBJECTIVE AND A 2.8 DEG FOV. THE RADIATION IS FOCUSED ONTO   |  |
| THE S  |  |
| RPH SCANNING IN A PLANE NORMAL TO THE S/C  |  |
| BACH REVOLUTION THE BIRROR VIEWS SPACE, THE EARTH FROM HORIZON   |  |
| ATTRES RECORDED FOR SPACE AND THE HOUSING ARE USED FOR CALIBRA-  |  |
| TION. THE OUTPUT FOR EACH DETECTOR IS A ZERO TO 6.4 VOLT ANALOG  |  |
| F  |  |
| $\Box$   |  |
| 1  |  |
| INPRARED RADIATION FROM THE BARTH AND ATMOSPHERE 33. MEASUREMENT HANGE   |  |
| 185-300 DEG K POR 10 MCRN CHAN; 185-270 DEG K FOR 6,15 MCHN CHANS  |  |
| 34, PRECISION AND ACCURACY   |  |
| S/N OF BETTER THAN 30 DB; ABSOLUTE ACCURACY OF +-7 DEG C   |  |

| RADIONETER   STATE     | NICS  |
|--|---|
| TIME  TONAL  SALINTARREANCE SS. INTERFERENCE SG. INTERFERENCE  SALINTARREANCE SS. INTERFERENCE SG. INTERFERENCE  TONAL STALLEMETRY RECUIREMENTS  TONAL STALLEMETRY RESPONSE TO EARLIFFE  TONAL STALLEMETRY RECUIREMENTS  TONAL STALLEMETRY REC | AK POWER S. MTBF EEGUENCY OF OBSERVATION NTINUOUS AND CONVERTED TO ECORDED ON TAPE TTON HAS IN-   |
| TIME  20 LB  44. NITRIGENERAL DATA BE SAMPLED 3  SEACE AND MRIR HOUSING DELIGION OF STATE BACH DATA  SEACE AND MRIR HOUSING DELIGION OF DATA  SEACE AND MRIR HOUSING DELIGION OF DATA  SEACE AND MRIR HOUSING DELIGION OF DATA  B-BIT DIGITAL DATA BACH DATA  RIBU-  1) GOLDBERG, I.L.: METEOROLOGY  CREASED ACCURACY OF DATA OVER  A-A-A-A-A-A-A-A-A-A-A-A-A-A-A-A-A-A-A  | AK POWER SS MTBF EQUENCY OF OBSERVATION NTINUOUS AND CONVERTED TO ECORDED ON TAPE TTON HAS IN-  |
| TIONAL   20 LB   | NTINUOUS AND CONVERTED ECORDED ON TAP   |
| DOTINE  St. INTERFERENCE   St. I | ECUENCY OF OBSERVAT NTINUOUS AND CONVERTED ECORDED ON TAP   |
| TERMENTON  SPACE AND MRIR HOUSING DELIGIONS  SPACE AND MRIR HOUSING DELIGIONS  SPACE AND MRIR HOUSING DELIGIONS  ANALOG SIGNALS ARE SAMPLED 3.  TERMENT SPONTED PROTUNTATIONS  TERMENT SPONTED ACCURACY OF DATA OVER SPONSE AND CREASED ACCURACY OF DATA OVER SPONSE AND SPECTAL RESPONSE AND SPECTAL SPANSES SPONTED AT 13TH ANNUAL TECH SIGNAL SPANSES SPONTED AT 13TH ANNUAL TECH SIGNAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN PURPOSE TO EARLIEF SES DIAGRAMS ATO-  EMBER SPONTED ACCURACY OF DATA OVER SPECTAL SPANSES SIMILAR IN SPANSES SIMILAR  | SENSITIES  DATA RECOVERY  ELAYED TELEMETRY CONTINUOUS  33-1/3 TIMES PER SEC AND CONVERTED  ATA WORD BIT IS THEN RECORDED ON TAP                         |
| PER CALLEMETRY REQUIREMENTS  SPACE AND WRREHOUSING DELICATION  SPACE AND THER HOUSING DELICATIONS  E UNC STELEMETRY REQUIREMENTS  RANDOG SIGNALS ARE SAMPLED 3.  8-BIT DIGITAL DATA BACH DATA  RON BON CREASED ACCURACY OF DATA OVER  1 GOLD BERG I.L. METERONICOLOSY  23, 1968.**2) NIMBUS B PRESS  24, MARCH 1968.  1 MARCH 1968.  1 MARCH 1968.  2 MIRBUS B DATA UTLIZATION PLA  4, MARCH 1968.  2 MIRBUS B DATA UTLIZATION PLA  4, MARCH 1968.  2 MIRBUS B DATA UTLIZATION PLA  4, MARCH 1968.  2 MIRBUS B DATA UTLIZATION PLA  4, MARCH 1968.  2 MIRBUS B DATA UTLIZATION PLA  2 MARCH 1968.  2 MIRBUS B DATA UTLIZATION PLA  4, MARCH 1968.  2 MIRBUS B DATA  3 MARCH 1968.  3 MARCH 1968.  3 MARCH 1968.  4 MARCH 1968.  3 MARCH 1968.  4 MARCH 1968.  5 MIRBUS B DATA  6 MARCH 1968.  5 MIRBUS B DATA  6 MARCH 1968.  6 MIRBUS B DATA  6 MARCH 1968.  6 MIRBUS B PRESS  6 MIRBUS B PRESS  6 MIRBUS B PRESS  8 MIRBUS  6 MIRBUS B PRESS  8 MIRBUS  6 MARCH 1968.  6 MARCH 1968.  6 MIRBUS B PRESS  8 MIRBUS  6 MIRBUS  6 MARCH 1968.  6 MARCH 1968.  6 MIRBUS  6 MARCH 1968.  | DATA RECOVERY  ELAXED TELEMETRY CONTINUOUS  33-1/3 TIMES PER SEC AND CONVERTED  ATA WORD BIT IS THEN RECORDED ON TAP  AND IN-PLICHT CALIBRATION HAS IN- |
| SPACE AND WRIR HOUSING   DELA  | ELAYED TELEMETRY CONTINUOUS  33-1/3 TIMES PER SEC AND CONVERTED  ATA WORD BIT IS THEN RECORDED ON TAP  AND IN-PLICHT CALIBRATION HAS IN-                |
| E JUNC  RAN ALOG SIGNALS ARE SAMPLED 3.  RAN ALOG SIGNALS ARE SAMPLED 3.  RAN ALOG SIGNALS ARE SAMPLED 3.  RAN ALOG SIGNALS ARE BACH DATA  RAN ALOG SIGNALS BACH DATA  RAN ALOG SIGNALS BACH DATA  RAN ALOG SIGNALS  RAN BASH SIGNAL LANIATIONS  RAN BASH SIGNAL SECTOR BACH SIGNALS  RAN BASH SIGNAL SIGNAL SIGNAL  | 33-1/3 TIMES PER SEC AND CONVERTED ATA WORD BIT IS THEN RECORDED ON TAPAND IN-PLICHT CALIBRATION HAS IN-  |
| E UNC  B - BIT DIGITAL DATA. BACH DATE  B - BIT DIGITAL BACH BACH SAVE  B - BIT DIGITAL BANUAL TECH SI  B - BIT DIGITAL BANUAL TECH SI  B - BIT DIGITAL SAVE SAVE SAVE SAVE  B - BIT DATA UTLIZATION PL.  B - BIT DATA UTLIZ | 33-1/3 TIMES PER SEC AND CONVERTED ATA WORD BIT IS THEN RECORDED ON TAPAND IN-PLICHT CALIBRATION HAS IN-  |
| POR PLAYEACK.  POR PLAYAGES AND LIMITATIONS  TEB OR  TRIBU- TRIBU- TRIBU- TO SPECTRAL RESPONSE AND CREASED ACCURACY OF DATA OVER  CREASED ACCURACY OF DATA OVER TO SPECTRAL RESPONSE AND CREASED ACCURACY OF DATA OVER TO SERVENCES THE WARTED AT 13TH ANUAL TECH SS SHITBA SE SHITBE  SE SHITBA SE SHITBA SE SHITBE TO SE SHITBA SE SHITBE TO SE SHITBA SE SHITBA SE SHITBE TO SE SHITBA S | ATA HORD  |
| TED OR PLAYBACK.  CA. ADVANTACES AND CHMITATIONS  TED OR  TERNOES  TERBU-  TRIBU-  1) GOLDBERG, I.L.: METBOROLOGY  TRIBU-  1) GOLDBERG, I.L.: METBOROLOGY  SENTED AT 13TH ANNUAL TECH SY  SENTED AT 13TH ANNUAL TECH SY  SENTED AT 13TH ANNUAL TECH SY  THANG TO SENTED AT 13TH ANNUAL TECH SY  SENTED AT 13TH ANNUAL TECH SY  TA ARCHITER  SENTED AT 13TH ANNUAL TECH SY  ATO-  BE HAROGHOMS  SENTED AT 13TH ANNUAL TECH SY  TO SENTED ANNUAL TECH SY  TO SEN | AND IN-PLIGHT CALIBRATION HAS   |
| TED OR THE OR CREASE AND LIMITATIONS TRED OR THE PROPERTY OF DATA OVER CREASED ACCURACY OF DATA OVER CREASED ACCURACY OF DATA OVER CREASED AT 13TH ANNUAL TECH SYSTEMES AT 13TH ANNUAL TECH SYSTEMES AT 13TH ANNUAL TECH SYSTEMES AT 1968.***2) NIMBUS DATA UTILIZATION PLANCE OF HANDER OF HA | AND IN-PLIGHT CALIBBATION HAS   |
| TED OR CREASED ACCURACY OF DATA OVER TRIBU- ON CREASED ACCURACY OF DATA OVER TRIBU- OF REFERENCES 1) GOLDBERG, I.L.: METEOROLOGS TE SENTED AT 13TH ANNUAL TECH SISTENCE SENTED AT 13TH ANNUAL TECH SISTENCE AT 13TH ANNUAL  | AND IN-PLIGHT CALIBRATION HAS   |
| TRIBU-  " REFERENCES  TRIBU-  " REFERENCES  1) GOLDBERG, I.L.: METEOROLGOS  TE  SENTED AT 13TH ANUAL TECH SOS  SENTED AT 13TH ANUAL TECH SOS  SENTED AT 13TH ANUAL TECH SOS  LIER 4. MRCH 1968.**2) NIMBUS B PRESS  ***3) NIMBUS B DATA UTILIZATION PLA  " MRCH 1968.*  " MRCH 1968. |   |
| TRIBU-  1) GOLDBERG, I.L.: METBOROLOGY  1) GOLDBERG, I.L.: METBOROLOGY  SENTED AT 13TH ANNUAL TECKS SENTED  23, 1968.***2) NIRBUS B PRESS  LIA-  100NS  WIRBUS B DATA UTLIZATION PLA  WARCH 1968.  SIMILAR IN PURPOSE TO EARLIEF  SE DIAGRAMS  EN ST C  EN ST C  SE DIAGRAMS  CHANS  CHANS  CHANS  CHANS  CHANS  CHANS  CHANS  CHANS   | OF DATA OVER TIROS MRIR: MOVING PARTS.  |
| TE SENTED AT 13TH ANNUAL TECH SI SENTED AT 194 MANUAL TECH SI SENTED AT 194 MANUAL 1968 TO EARLIEF SENTEMBRY.  EN SIMILAR IN PURPOSE TO EARLIEF SENTEMBRY.  EN ST SIMILAR IN PURPOSE TO EARLIEF SENTEMBRY.  ES AT SENTEMBRY.  ES AT SENTEMBRY.  ES AT SENTEMBRY.  EN ST SENTEMBRY.  EN SENTEMBRY.  EN ST SENTEMBRY.  EN SENTEM |   |
| TE SENTED AT 13TH ANUAL TECH SIZENTES 23, 1968.***2) NIBBUS B PRESS ****3) NIBBUS 2 USER'S GUIDE. LIER 44 MARCH 1968. LIC 55. HSTORICAL REWARKS LIC SENENT, REWARKS LONS 65. DIAGRAMS LONS 65. D | METEOROLOGY INSTRUMENTS POR SATELLITES, PRE-  |
| ### 1968.***2) NINBUS B PRESS  ***3) NINBUS B PRESS  ***3) NINBUS B PRESS  ***3) NINBUS B DATA UTILIZATION PLA  ### MRCH 1968.  #### | TECH SIMP OF SOC PHOTO-OPTICAL ENGRS, AUG   |
| LIER NIMBUS 2 USER"S GUIDE.  LIER NIMBUS 2 USER"S GUIDE.  NIMBUS B DATA UTLIZATION PLA  LARCH 1948.  LARCH 1948.  LARCH 1948.  SIMILAR IN PURPOSE TO EARLIEF  SE DIAGRAMS.  ENDING  SE DIAGRAMS.  ONTO  ES AT  NG GE DIAGRAMS.  CHANS  CH | B PRESS KIT, NO: 68-84K, NASA, MAY 10, 1968.  |
| LIER WIMBUS B DATA UTILIZATION PLA  ING HORS BE HORSE TO EARLIEF  ES HINT BE ATO  ES A | SABATINI  |
| ING ING ING IONS ROUS) EATO PARTO PARTO OD ONTO BES AT ISBRA- ISB | PLA   |
| L L L L L L L L L L L L L L L L L L L  |   |
| LL LL STATE STATE EMBIT, PRATE DONTO BES AT ONTO BES A |   |
| TONS) EMENT, EMENT, PARATE TOO NOTO ES AT TOO NOTO TORED TORED CHANS   | RLIER TIROS MRR   |
| IICRONS) PRATO- CBPARATE IN.DIA- SED ONTO ATES AT ATES AT ALIBRA- ALIBRA- ANALOG STORED STORED HW CHANS  |   |
| TERE, TRATO- TO REMENT, SEDANTE IN.DIA- SED ONTO ATES AT ALIBRA- ANALOG STORED STORED STORED STORED  |   |
| UREMENT, SEPARATE SEPARATE SED ONTO ATES AT RING TEMPER- ALIBRA- ANALOG STORED STORED STORED RING STORED   |   |
| GEREMENT, SEPARATE INDIA— ATES AT RING ORIGO ALIBRA— ANALOG STORED STORED HN CHANS   |   |
| SEPARATE IN.DIA- SED ONTO ATES AT ATES AT CORIZON TEMPER- ALIBRA- ANALOG STORED STORED HW CHANS  |   |
| IN.DIA- SED ONTO ATES AT ATES AT ORIZON TEMPER- ALIBRA- ANALOG STORED STORED   |   |
| ATES AT RELES AT RELES AT REMPER- ALIBRA- ANALOG STORED STORED RN CHANS  |   |
| MAHMHAH I I I I  |   |
| ZHNHZH I I I I   |   |
| HMHZH III  |   |
| MHZH I I I   |   |
| HZHIII   |   |
| Z  |   |
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| INSTRUMENT RESUME   | 18. SPECTAAL FANGE 10. SPECTRAL RESOLUTION 12, TIME CONSTANT                          |
|---|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIGGE MASSACHLISFTS   | 0. TO 2600. A DOF VIEW 39 GROUND SWATH  |
| 1, TITLE 2. ACRONYM 3. EXP NO   | 100. DEGITUDE NO DIAM CIRCLE FROM 600 NK ALTITUDE                                     |
| MONITOR OF ULTRAVIOLET SOLAR ENERGY A RESUME S. WARREN  | PONTING ACCURACY OF PONTING RATE AND ALTITUDE 15 INCLINATION                          |
| 11/10/69  | LAR   |
| R 7. ORGANIZATION B. TELEPHONE  |   |
| REATH, DR. D.R. GODDARD SPACE FLT CENTER 301-982-6421   | 27 CAMIDANIANTE   |
|   | E DETECTORS, SUN ASPECT S   |
| 12 CONTHACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. SATE 16. CONTRACT NUMBER 15. SATE 10. CONTRACT NUMBER 15. SATE 15. | 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDBY FORMER 52. PEAK POWER 53. MTBF    |
| 18. MONITOR 19. AGENCY 20.FGM OFFICE 21. TELEPHONE  | 54. INTERFEE ENCE 55. INTERFERENCE 196. INTERFERENCE 157. INTERFERENCE 158. SHIELDING |
| SCHARDT, B. B. INASA HDOTRS OSSA/SRN 202-962-0891   | SENSITIVE: 1 (60. DATA RECOVERY (6) FRECUENCY OF OBSERVATION                          |
| CORPORATION WALTHAM, MASS 04/69 NA  | URRENTS DELAYED TELEMETRY   |
| SPECTROMETER, 5-CHANNEL OPTICAL-FILTER PHOTODIODE UNC   | 30 BIT DIGITAL WORD READ ONCE EVERY SECOND AT 4 KBITS PER SEC.                        |
| TH-PHYS   |   |
| TOTALS DE AN ORDINA TRATES OF DEFENDENT FURBING THE OF STREET   | 163. ADVANTAGES AND LIMITATIONS   |
| AE,   |   |
| CREASE OF FI  |   |
| SATELLITE ENTERS THE EARTH SHADOW NEAR THE POLES, TO MEASURE ATMOSPHERIC OZONE  | 1) NORMYLE, W.J.: NIMBUS B TO TEST NEW WEATHER SENSORS, IN                            |
|   | US B, NASA RELEASE NO: 68-48K, MAY 1968.*   |
|   | COMMAND AND TELEMETRY DIRECTORY, VOL 2,   |
| THIS EXPERIMENT, SIMILAR TO ONE FLOWN ON NIMBUS D, USES 5 PHOTO-  | SYSTEMS. GENERAL ELECTRIC CO. PHILADELPHIA, PA. AUG. 1967.                            |
|   | 65. HISTORICAL REMARKS  |
|   |   |
| PTICAL FILTE  | 66. DIAGRAMS  |
| TERRITOR THE SHORT WAVELENGTH CUTOPY FOR EACH REGION, AND THE CHOICE OF DECTORS HAVELENGTH  |   |
| CUTOPP. A SOLAR ASPECT SENSOR GIVES THE ANGLE AT WHICH THE SUN'S  |   |
| RAYS STRIKE THE DIODES WITH 7 BIT ACCURACY. USABLE DATA IS 08-  |   |
| TAINED OVER A 100 DEG FOV. THE KADLATION INTENSITY IS READ AS<br>THE CURRENT PROM THE PHOTODIODES BY RITHER OF TWO PARALLEL ELEC-   |   |
| TROMETERS WITH POUR DECADE RANGES. THERE IS AN AUTOMATIC ZERO   |   |
| SETTING DEVICE POR THE ELECTROMETERS. THEY ARE CALIBRATED USING   |   |
| AN EXPERIMENT CYCLE TAKES 48 SEC INCLUDING CALIBRATION CHECKS,  |   |
| DATA, EACH SENSOR IS MONITORE   |   |
| POR 5 SEC PER CYCLE, WHEN THE S/C IS OVER THE POLAR REGIONS THE RABETH'S ATMOSDHEDE ATTENDANCE THE IN SERVICE OF THE  |   |
| JEASURES OF THE OZONE   |   |
| 32. PHENOMENA OBSERVED  |   |
| OLTRAVIOLET SOLAR RADIATION FLUX  |   |
| SIGNAL CURRENT PROM 0,1 TO 100 NANOAMPS   |   |
|   |   |
| ABSOLUTE ACCURACY OF FLUX MEASUREMENTS WITHIN 20 PERCENT  |   |

| INSTRUMENT RESUME  | 38. SPECTRAL RANGE 38. SPECTRAL RESOLUTION 37. TIME CONSTANT 11 1 4 40 15 0 MICDONS 0 6 DEDCENT  |
|--|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBIDGE, MASSACHUSETTS  | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  |
| 1, TITLE   2. ACRONYM 3. EXP NO  | C. U DI 12.0 UEST 12.0 NIT DI 12.0 NIT FRUE DUO NIT  |
| ļ.,  | O MM ALTITUDE  |
| 4, RESUME DATE   | ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL REQUIREMENTS   |
| NAT ENV SAT CIR, ESSA  |  |
| ORGANIZATION   | 47. COMPONENTS   |
| HILLEARY D.T. NAT ENV SAT CTR, ESSA 301-735-0021   | RIXED-GRATING IR SPECTROMETER, CALIBRATION SOURCE, FLECTRONICS of well to work the source of the state of the |
| TEAST MUCK NOMBER 1. DATE  | 2000   |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 54. INTERPERENCE   S. INTERPERENCE   S. INTERPERENCE   ST. INTERPERENC |
| C. B. B. NASA HDOTRS OSSA/SRN 202-962-   | SENSITIVE  |
| LOCATION ASSESSMENT AS |  |
| 28. INSTRUMENT TYPE SUITLAND, MAKKLAND 104/69, NA  | BLK BDY RADIATION SOURCE; DELAYED TELEMETRY CONTINUOUS   |
| 8-CBANNEL IR PASTIE-EBERT FIXED-GRATING  | 9 PRIMARY CHANNELS WITH 10 BIT ACCURACY, ALL SAMPLED WITHIN 100  |
|  | והבהווחו המהה בחובה היהתו וכ   |
| 30. PURPOSE  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY- TO REASONE THE TEMPERATURE PROFILE PROM THE EARTH'S   |  |
| MOREGIE OR CECCU TOPS TO 13 SILE ALLITOURS.***SECONDARY TO MOREGIES OR CECCUSARY TO  | 64. AEFERENCES   |
| Soni Bon tout and tour   | 1) GOLDBERG I.I. METEOROLOGICAL IR INSTRUMENTS FOR SATELLITIES.  |
| •  | 13TH ANNUAL TECH SYMP OF SPIE, AUG 1968.   |
| 3. PRINCIPLES OF OPERATION   | NIMBUS B PRESS KIT, NASA RELEASE NO. 68-84K, MAY 1968.***3)  |
|  | R.A. DUS INTERES REPORT ON   |
| THE INSTRUMENT IS A FASTIK-KEEKT GRATING INFRAKED SPECTOR TROPERS BY DETECTOR  | INSTRUMENTS, NASA ERC PRIO 16, CORE 1407.  |
| AT EACH OF 8 EXIT SLITS. RADIATION IS MONITORED IN 7 INTERVALS   | 65. HISTORICAL REMARKS   |
| н  |  |
| MOSPHERIC  | 16. DIACHAMS   |
| MICRONS. A TWO POSITION PLANE MIRROR REFLECTS EITHER A BLACK   |  |
| RADIA  |  |
| ALTERNATELY VIEWS THIS RADIATION OR COLD SPACE, PROM THERE THE   |  |
| RADIATION FASSES THOU AN UNIDER LIBERT LANGUAGE TO THE CONTROL OF  |  |
| LINES/IN, DIPPRACTION GRATING, THE SPHERICAL MIRROR AGAIN, AND   |  |
| ADIATION IS GATHERED CONTING   |  |
| PROM A VIEWING ANGLE OF 0.04 STERADIAN (12x12 DEG) CENTERED ON   |  |
| THE NADIR. THIS GIVES DATA ALONG A NORTH-SOUTH STRIP WHOSE PRO-  |  |
| ADJACENI SINIFS AND<br>R. THE 11.1 MICRON DI   |  |
| 'n   |  |
| PRESSURE PROFILES BY A   |  |
| MATHEMATICAL INVERSION TECHNIQUE. DATA IS ACCUMULATED IN 6 SEC<br>INTERVALS TO GIVE PROPILES EACH 50 MILES ALONG THE STRIP.  |  |
|  |  |
| IR RADIATION EMITTED FROM THE BARTH'S ATMOSPHERE, SURPACE, CLOUDS. MEASUREMENT RANGE   |  |
|  |  |
| 34, PRECISION AND ACCURACY   |  |
| TEMP TO 1 DEG K; PRESSURE TO 10 MB   |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 38. SPECTRAL RANGE 38. SPECTRAL RESOLUTION 37. TIME CONSTANT 38. FIELD OF VIEW 39. GROUND SWATH 38. FIELD OF VIEW 39. GROUND SWATH 3. DFG 30. RY 30. NM PROM 6.00. NM ALTITUIDE  |
|--|--|
| TITLE SPECTROMETER PMC   | RAESOLUTIONAL SPATIAL RESOLUTION DEG 30 MM PROM 600 NM ALTITUTION  |
|  | SACCURACY 43 POINTING RATE 44 ALTITODE   |
| GATOR 7. ORGANIZATION  | 46. SPECIAL REQUIREMENTS   TEU CIRCULAR   SUN-SINCH REIROGRADE   |
| HOVIS, DR. W. A. GODDARD SPACE PLT CENTER 301-982-6465  a. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE  | 47. COMPONENTS   |
|  | SPECTROMETER, TELESCOPE, 2 DETECTORS, ELECTRONICS  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 16. CONTRACT NUMBER 15. DATE 16. DAT | 48 WEIGHT 49, VOLUME 50 AVERAGE POWER 51, STANOBY FOWER 52, PEAK POWER 53, MTBF  |
| 19. AGENCY 20.PGM OFFICE 21. TELEPHO   | HAGNETIC TANGETICAL NUCLEAR  |
| SCHARDT, B. B. NASA HDOTRS   OSSA/SRN 202-962-0891   | AS CALIBBATION AS DATA SECONDS AS ESPECIALLY RADIATIVE COOLING   |
| 03/70  | 31 DELAYED TELEMETRY   |
| 26. INSTRUMENT TYPE SECURITY SPECTAGORPHER CTRCHIA 8-42PACE INTERPREDENCE-PITTED INDIVIDED INC.  | 62. TELEMETRY REQUIREMENTS 308 BITTS DED SECOND  |
| LICATION 29. SPACEGRAFT  |  |
| MET NIMBUS D   | 23 ANIANTAGE AND INITACIONE.   |
| DRIMBAY - TO DETERMINE THE LATERAL DISTRIBUTION OF THE TOWAR   | TOU FORTH TOUR DOUBLE DONNER STREET TARTED TO BOURT TEXT TOUR TOUR TOUR TOUR TREET TO THE TEXT TOUR TOUR TOUR TOUR TREET TO THE TEXT TOUR TOUR TREET TO THE TEXT TOUR TOUR TREET TREET TOUR TREET TREET TOUR TREET TR |
| COLUMN, ***SECONDARY-  | ITUDES, HAS MOVING PARTS   |
| WATER  | 64. REFERENCES   |
| ANY PARTICULAR UNIT VERTICAL COLURN. AND THE LATERAL VARIATION OF THE VERTICAL DISTRIBUTION.   | 1) GARAFOLE, P.: PWS SUBSYSTEM DIRECTORY (PRELIM), GENERAL ELECTRIC CO., PHILADELPHIA, PA., DEC. 1967. ***2) MINZNER, R.A.,  |
| 1) Deliver of the African Commence of the Comm | INTERIM REPORT ON SATELLITE METEOROLOGICAL INSTRUMENTS, NASA/ERC   |
| - 1  | REPORT NO. PM-6/13, JUNE 1967.   |
| TION THROUGH A CONTINUOUSLY ROTATING (ONCE EVERY 16 SEC) FILTER  |  |
| F 100-LAYER INTERFE  | 65. HISTORICAL REMARKS   |
| PILTER WITH THE LAYER THICKNESS LINEARLY INCREASING AS A PUNC-   | VILLA AND AND AND AND AND AND AND AND AND AN   |
| TION OF ANGULAR POSITION, CAUSING THE BAND PASS TO SHIPT TOWARD  | 66. DIACRAMS   |
| BAND AND THE OTHER THE 1.2-2,4 MICRON BAND. AN IMMERSED LEAD   |  |
| DIATION IS SAMPLED 20  |  |
| TIMES A SECOND. THE RESULT IS A SPECTRAL INTENSITY PLOT OF 158   |  |
| NORMAL TO THE EARTH'S SURPACE COLLECTS ATMOSPHERIC RADIATION   |  |
| A 3 DEG FOV DIRECTLY BELOW THE SA  |  |
| TUDE IN A SUN-SYNCHRONOUS ORBIT, A POLE-TO-POLE STRIP OF ATMOS-  |  |
| SEPARATION BETWEEN SUCCESSIVE STRIPS AT THE EQUATOR, NARROW  |  |
| SPECTRAL REGIONS IN THE CO2 AND H20 ABSORPTION BANDS AT 4.3 AND  |  |
| 6.3 MICKON AND IN A MINDOW REGION ARE OF INTEREST. CALIBRATION IS ACCOMPLISHED BY CHOPPING AGAINST A BLACKBODY OF KNOWN TEMPER-  |  |
| ATURE, 27+-0.5 DEG C. THE SPECTRA ARE ANALYZED BY THE METHOD OF  |  |
| INVERSION OF RADIATIVE TRANSFER EQUATIONS.   |  |
|  |  |
| ìi   |  |
|  |  |
| 34. PRECISION AND ACCURACY   |  |
|  |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS | 36. SPECTRAL RANGE  0.4 TO  0.4 TO  38. SPECTRAL RESOLUTION 197. TIME CONSTAIRT  38. SPECTRAL RESOLUTION 197. TIME CONSTAIRT  38. SPECTRAL RESOLUTION 197. TIME CONSTAIRT  39. SPECTRAL RANGE  39. SPECTRAL RANGE  39. SPECTRAL RANGE  39. SPECTRAL RESOLUTION 197. TIME CONSTAIRT  39. SPECTRAL RANGE  39. SPECTRAL RANGE  39. SPECTRAL RESOLUTION 197. TIME CONSTAIRT  39. SPECTRAL RANGE  39. SPECTRAL RESOLUTION 197. TIME CONSTAIRT  40. TIME CONSTA |
|--|--|
| 1, TITLE 2. ACHONYM 3, EXPINO  | RESOLUTION 41. SPATIAL RESOLUTION  |
| IMAGE-DISSECTOR CAMERA SYSTEM  | SOO NM ALT   |
| 11/10/69   | MED CIRCULAR SHALL RETROGRADE  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   |  |
| BRANCHFLOWER, G. GODDARD SPACE FLT CENTER 301-982-5539   |  |
| C. Charles   | TMAGE DISSECTION SCANNING APPROPRIES 12 STAGE RIECTRON MILTIPLIER  |
| JABER 14. FLASH INDEX NUMBER 15. DATE 16. CONFILING  |  |
| NAS5-9619  | 14 IB 0.2 CU PT 12 WATTS 1 WATT  |
|  | 34. INTERFERENCE 33. INTERFERENCE 34. INTERFERENCE 34. SHELLING SENSITIVE  |
| 23 LOCATION  |  |
| ITT INDUSTRIAL LABS FORT WAYNE, INDIANA 03/70  | ROIGE MATRY REQUIREMENTS   |
| CH ELECTRICALLY-SCANNING PHOTOCATHODE VISIBLE  | 1 VIDEO CHANNEL (1800 HZ BANDWIDTH), 12 HOUSEKERPING CHANNELS  |
| 28. APPLICATION  WENT  |  |
| 9005   | 63 ADVANTAGES AND LIMITATIONS  |
| PRIMARY-TO ACQUIRE HIGH-RESOLUTION PICTURES OF THE RARTH'S   | HAS APT CAPABILITY; DAYLIGHT USE ONLY.   |
| DATIRE CLOUD COVER.  | P DESCRIPTION  |
|  | 1) FRANKLIN, W., IDCS SUBSYSTEM DIRECTORY (REVISED).***2)  |
| 94   | MINZNER, R. A.: INTERIM REPORT ON SATELLITE METEOROLOGY INSTRU-<br>MENTS. NASA/ERC REPORT NO. PM-6713. JUNE 1967.  |
| 3. PRINCIPLES OF OPERATION   |  |
| THE IMAGE DISECTOR CAMERA PERFORMS THE PURCTIONS THAT PREVIOUS-  |  |
| ¹ ≅  |  |
| HOTOCATHODE  | REPLACES AVCS PLUS APT. FLOHN ON ATS 3 AND NIKBUS 3.   |
| THOUS ARE EMITTED FROM THE SURFACE IN PROPORTION TO THE INCIDENT   | U. C. P. C.  |
|  |  |
|  |  |
| OF BRONKILC DEFINATION. THE APERTURE SABPLES THE FLECTRON LEAGH  |  |
| THE SIGNAL BY ABOUT 10 MILLION. THE CAMERA IS USED IN THE LINE   |  |
| z  |  |
| PROVIDING THE OTHER SCAN COMPONENT. NO SHUTTER IS REQUIRED AS  |  |
| I (1800 HZ) RESULTS IN   |  |
| WITH THE HIGH  |  |
| THE CAMERA-LINE PREQUENCY IS 4 HZ WITH THE PRAME PERIOD BEING  |  |
| TION IS 1.7 NM AT THE SUBSATELLITE POINT. REALTIME PICTURES CAN  |  |
| BE TRANSHITTED TO APT RECEIVING STATIONS.  |  |
| 410 40   |  |
| LIGHT REFERENTED FROM THE EARTH'S SURFACE AND CLOUD COVER 33. MEASUREMENT RANGE                                      |  |
| 100 TO 10,000 POOT-LAMBERTS  |  |
|  |  |
| BOO TV LINE RESOLUTION, S/N=40 DB AT 10,000 FOOT-LAMBERTS  |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | 38 SPECTRAL RANGE  6.5 TO 40.0 MICRONS 0.32 PERCENT 3. MILLSEC  38 FIELD OF VIEW  59 SPECTRAL RESOLUTION 37 TIME CONSTANT  50 MILLSEC  51 NA DIAM CIPCLE PROM 600 NM ALTITIDE |
|---|---|
|   | R RESOLUTION 11. SPATIAL RESOLUTION   |
| INPRABED INTERPEROMETER/SPECTROMETER IRIS (TITLE CONT.) 4 RESUME S. VARIOUR   |   |
| 8. PRINCIPAL INVESTIGATOR 1. ORGANIZATION 8. TELEPHONE  | 46. SPECIAL REQUIREMENTS  |
| GODDARD SPACE PLT CENTER  |   |
| 10. 08  | 47. COMPONENTS TARRESO DE DOMENTE DE DOMENTE DE DOMENTE DE DOMEOCETECE  |
| CONTRAIN DIS B. 19UDDARD SEACE FLI CENTER 301 702 4233  | POWER 52, F   |
|   | 38 LB 0.3 CU PT 12 WATTS  |
| SCHARDT. B. R. NASA HDOTRS OSSA/SRN 202-962-0891  | 34. INTERFERENCE 35. INTERFERENCE 36. INTERFERENCE 57. INTERFERENCE 58. SHIELDING SPIN STATUE   |
| 23 LOCATION   | 60. DATA RECOVERY   |
| TEXAS INSTRUMENTS DALLAS, TEXAS 03/70   | BLK BODY AND COLD SPACE DELAYED TELEMETRY CONTINUOUS  |
| , MODIFIED MICHELSON INPRARED INTERPEROMETER  | 3.75 K-BITS PER SECOND POR 13 OUT OF 16 SECONDS   |
| 29, APPLICATION 29, SPACECRAFT ED.  |   |
| COGUTA  | 63. ADVANTAGES AND LIMITATIONS  |
| PRIMARY- TO DETERMINE THE VERTICAL TEMPERATURE PROFILE, VERTICAL  | NO INFORMATION WITH SOLID CLOUD COVER, LIMITED INFORMATION WITH   |
| OZONE DISTRIBUTION, VERTICAL WATER VAPOR DISTRIBUTION, AND TER-   | PARTIAL CLOUD COVER, IMC REQUIRED, MOVING PARTS 64. REFERENCES  |
|   | 1) MINZNER, R.A. ED,: INTERIM REPORT ON SATRLLITE METEOROLOGICAL  |
|   | INSTRUMENTS, NASA-ERC PM-6713, JUNE 1967. ***2) SILVER, J.: IRIS  |
| 31. PRINCIPLES OF OPERATION   | JUNE 1968.***3) GOLDBERG, I.L.: METEOROLOGICAL IR INSTRUMENTS FOR   |
| =   | SATELLITES, PRESENTED AT 13TH ANNUAL SYMPOSIUM OF SPIE, AUG. 68.  |
| CTON DANTAMION BEOM A CVITANDE OF AMERCHEDE GOOGE DAGE ON THE   | AS HISTORICA REMARKS  |
| SIMPACE OF THE PARTH IS A CIPINDER OF AIRCENERS, WHOSE DANC OF THE  | ממי נומו לנומי באוצעות  |
| PLECTED INTO THE INSTRUMENT PROM A PLANE MIRROR WHICH ROTATES TO  | 66. DIAGRAMS  |
| INAGE MOTION COMPENSATION. THE  |   |
| BRAMS, ONE OF WHICH IS REPLECTED FROM A MOVING MIRROR, RECOMBIN-  |   |
| ED AND FOLUSED ONLO A BOLDOMETER DELECTION. INTERFERENCE EFFECTS RESELLY PROM THE DATH LENGTH DIPPERENCES IN THE TWO BEAMS AS THE   |   |
| IN 13 SEC TO  |   |
| BSERVATIONS   |   |
| IS NO OVERLAP IN SUCCESSIVE OBSERVATIONS. AFTER RECORDING 14  |   |
| INTERPEROGRAMS, TWO CALIBRATION OBSERVATIONS ARE MADE, ONE FOR A  |   |
| TREFERENCE BLACKBODY AT 300 K AND ONE FOR OUTER SPACE, A FOURTER TRANSPORMANTON. DERPORMED BY DIGITAL COMPUTER MIST BE MADE ON  |   |
|   |   |
| RIATE SPECT   |   |
| TRANSFER EQUATIONS.   |   |
|   |   |
| REFLECTED AND EMITTED IN ENERGY PROF BARTH AND ITS ATMOSPHERE 33. MEASUREMENT RANGE   |   |
| A A A CALIFORNIA AND A |   |
| TEMPERATURE TO 2 DEG K; TOTAL WATER VAPOR AND SCALE HEIGHT 5%   |   |
|   |   |

|  | TANKO MEN - KENO ME   |                                    |
|--|---|------------------------------------|
| NATION   | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, NASSACHUSETTS                                | 466. AND 401 38. FIELD OF VIEW NA  |
| 1. TITUE   | 2. ACRONYM 3. EXP NO  | 40 ANGULAR RESOLUTION 41, SPATIAL  |
| INTERROGATION, RECORD                              | INTERROGATION, RECORDING, AND LOCATION SYSTEM IRLS (TITLE CONT.)  | 42, POINTING ACCURACY 43, POINTING |
|  | 69/   |                                    |
| 6. PRINCIPAL INVESTIGATOR                          | 7. ORGANIZATION   | 46. SPECIAL REQUIREMENTS           |
| COTE, C. R.  | GODDARD SPACE FLT CENTER 301-982-4104   | 47. COMPONENTS                     |
| NTRACT NUMBE                                       | 14. FLASH INDEX NUMBER 15. START  |                                    |
|  | TO A ACENCY SOLD BOTO TO THE SECOND   | 25 LB 3 C                          |
| 8.8  | COTES   | SOII RC / SEN                      |
| •  | l N l   | 59. CALIBRATION                    |
| RADIATION, INC.                                    | MELBOURNE, FLORIDA 03/70  | STNEMBOURGE VETEMBLET CA           |
| TRANSPONDER, UHP                                   |   | 20 CHANNELS: 5 DIGI                |
| 1 1  | +   |                                    |
| 30. PURPOSE  | NIMBUS D  | 63. ADVANTAGES AND LIMITATION      |
| PRIMARY- TO LOCATE SU                              | TO LOCATE SUCCESSIVE POSITIONS OF EACH UNIT OF A SET OF   | TOTAL BIP WEIGHT IN                |
| IN-SITU DATA-GATHERIN                              | IN-SITU DATA-GATHERING MODULES (E.G., THE BALLOON INTERROGATION   | BIPS NEAR THE EQUAT                |
| BY PACH (DIE) : IO NEC                             | CELVE AND SLOKE IN THE S/C INE DATA MEASUNED<br>RANSMIT THE STORED DATA TO A GROUND STATION                                       | 1) JONES H. TRES                   |
| FOR PROCESSING. THE POR OBTAINING WIND AN          | G. THE OBJECTIVE IS TO ESTABLISH A WORLD-WIDE NET<br>WIND AND OTHER METEOROLOGICAL DATA.  |                                    |
| 31. PRINCIPLES OF OPERATION                        |   | REPORT NO. PM-6713,                |
| THIS INSTRUMENT IS SI                              | THIS INSTRUMENT IS SIMILAR TO THAT FLOWN ON NIMBUS 3. IT CON-   | -                                  |
| STAGE, RECEIVER (466                               | MHZ), DECODING AND CODING CIRCUITS, RANGE   | 65. HISTORICAL REMARKS             |
| DETECTOR AND MEMORY (                              | DETECTOR AND MEMORY (100 KBIT). THE DATA MODULES EACH WITH A  | SIMILAR TO THE NIMB                |
| IS AN EXAMPLE, CONTAI                              | UNITED SUBMEST, OF SHIRCH THE SHIRCH INTERCOLLED FACUACION (PIE)  S AN EXAMPLE, CONTAIN A RECEIVER (401.5 MIS), DECODING AND COD- |                                    |
| S/C PASSES WITHIN RAN                              | NGE OF A COMMAND AND DATA ACQUISITION STA-  |                                    |
| TION (CDA) UP TO 370                               | TION (CDA) UP TO 370 COMMANDS CAN BE SENT AND STORED IN THE IRLS MEMORY. A COMMAND CONSISTS OF A TIME FOR AN INTERROGATION AND    |                                    |
| THE ADDRESS OF THE BI                              | BIP (OR OTHER MODULE) TO BE CONTACTED. WHEN   |                                    |
| THE STORED COMMAND TI                              | THE STORED COMMAND TIME AND THE S/C CLOCK TIME COINCIDE, THE S/C  |                                    |
| TRANSMITS ITS SENSOR                               | READINGS. THESE AND THE ROUND TRIP SIGNAL   |                                    |
| DELAY TIME BETWEEN TH                              | DELAY TIME BETWEEN THE BIP AND THE S/C ARE STORED IN THE IRLS   |                                    |
| MEMORY. THIS PROCEDU                               | MEMORY. THIS PROCEDURE IS REPEATED FOR EACH STORED COMMAND<br>BUTTL THE CDA INITIATES TEANSMISSION OF THE MEMORY CONTENTS AND     |                                    |
| THE STORAGE OF NEW CO                              | THE STORAGE OF NEW COMMANDS IN THE MEMORY. KNOWING THE S/C PO-  |                                    |
| SITIONS AND TWO RANGES TO OF A MODULE CAN BE FOUND | RANGES TAKEN ABOUT 150 SEC APART, THE POSITION<br>BE POUND TO WITHIN 2 KM.  |                                    |
| 32. PHENOMENA OBSERVED                             | - 1   |                                    |
| TRANSMISSIONS FROM RE                              | TRANSMISSIONS FROM REMOTE PLATFORMS-BALLOONS, BUOYS, SURFACE PKG  |                                    |
|  |   |                                    |
| 34. PRECISION AND ACCURACY                         |   |                                    |
| LOCATION TO +-1.1 NM:                              | LOCATION TO +-1.1 NM: DELAY TIME TO 0.625 MICROSEC  |                                    |
|  |   |                                    |

|         | AL RANGE   |
|---------|--|
|         | 466. AND 401.5 MHZ NA  |
|         | IELD OF VIEW   |
| ON G    | NA 40 ANGULAR RESOLUTION 41, SPATIAL RESOLUTION  |
| Volum 1 | 42 POINTING ACCUMENT   43, POINTING HATE   44, ALTITUDE   45, INCLINATION  |
| 005     | MED CIRCULAR   |
| ΓΓ      | -2. COMPONENTS   |
| П       |  |
| E       | 25 LB ASSERTED 18 NATTS 107 RATTS INCHERENCE 56 INTERFERENCE 50. INTERFERE |
| u u     | SOURC/SEN AND DATA RECOVERY IN ERECUIENTY OF ORSERVATION   |
|         | DELAYED TELEMETRY ON COMMAND   |
| UNC     | 62. TELEMETRY REQUIREMENTS 20 CHANNELS: 5 DIGITAL AND 15 ANALOG, SAMPLED BETWEEN 1 AND 16  |
|         | SECONDS  |
| ;       | AND LIMITATIONS  |
| 200     | TOTAL BIP MEIGHT INCLUDING SOLAR-POWER SOURCE IS TO POUNDS:<br>BIPS NEAR THE EQUATOR MAY NOT RESPOND ON SUCCESSIVE ORBITS<br>64 REFERENCES   |
| ONO     | H. IRLS SUBSYSTEM  |
| E 3     | CO., PHILA   |
| П       | L. PM-6713, JUNE 8, 1967.  |
|         |  |
|         | EMARKS   |
| 101     | SIMILAR TO THE NIMBUS 3 IRLS   |
| -do     |  |
| H 15    |  |
| RLS     |  |
| U A     |  |
| ۲       |  |
| AND     |  |
| <br>!   |  |
| ND      |  |
| <br>  z |  |
|         |  |
| DRG     |  |
|         |  |
| Τ       |  |
| П       |  |

| INSTRUMENT RESUME   | 38. SPECTRAL RESOLUTION 37. TIME CONSTANT 1200. TO 2600. A                  |
|---|---|
| ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | O OF VIEW   |
| 1. TITLE 2. ACRONYM 3. EXP NO   | 100. DES 100 DES                        |
| MONITOR OF ULTRAVIOLET SOLAR ENERGY   | NM ALTITUDE   |
|   | AZ POINTING ACTION OF THE THE CIRCULAR SUN-SYNCH RETROGRADE                 |
| INVESTIGATOR 7. ORGANIZATION 8. TELEP   |   |
| HEATH, DR. D.P. GODDARD SPACE PLT CENTER 301-982-6421 S. CO-INVESTIGATOR 10. ORGANIZATION                                       | 47. COMPONENTS  |
| - CONTRACT 1: CONTRACT NUMBER 14 CACHINGE NIGHT 12 CONTRIBING.  | PHOTODIODE DETECTORS, BLECTRONICS   |
| CONTRACT NOMBER 1. TEACH INDEX NOMBER 1. DATE   | SU. AVERAGE TOWER ST. STANDER ST. TEAN TOWER                                |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE   | 34 INTERERENCE 55 INTERFERENCE 56 INTERFERENCE 57 INTERFERENCE 58 SHIELDING |
| SCHARDT, B. B. NASA HDOTES OSSA/SRN 202-962-0891  | SENSITIVE  89. CALIBRATION  81. CALIBRATION  81. CALIBRATION                |
| MASS. 03/70   | DELAYED TELEMETRY TELEMETRY REQUIREMENTS                                    |
| SPECTROMETER, 6-CHANNEL OPTICAL-FILTER PHOTODIODE UNC   | 30 BIT DIGITAL WORD READ ONCE EVERY SRCOND AT 4 KBITS PER SEC.              |
| M-PHYS  |   |
|   | 63. ADVARITAGES AND LIMITATIONS   |
| PRIMARY-TO DETECT VARIATION OF RELATIVE INTENSITY OF SOLAR FLUX IN 5 SPECTRAL BANDS TO HELP DETERMINE THE DISTRIBUTION OF OZONE | !   |
| IN THE ATMOSPHERE; *** SECONDARY - TO MAKE ABSOLUTE MEASURENEITS OF   | 64. REFERENCES  |
| (*)   | E, W.J.: NIMBUS B TO TEST NEW WEATHER SENSORS.                              |
| LITE ENTERS THE BARTH SHADON NEAR THE POLES, TO MEASURE OZONE AND MOTPOLIAR OXYGEN HIGH IN THE REMOCERPER                       | AVIATION WEEK AND SPACE TECHNOLOGY, MAY 6, 1968, PP. 71-79, ***             |
| 3: PRINCIPLES OF OPERATION  |   |
| •   | IIA, PA.  |
| TODIODES TO MONITOR THE FLUX PROM THE SUN IN 6 WAVELENGTH RE-   | 65 HISTORICAL REMARKS   |
| CIONS. INDICE SECTIONS AND AL CAIO A CIND NUMBER DISCOUNTING B STOPH  |   |
| 1800 A WITH A 300 A WIDTH, 2100 A WITH A 450 A WIDTH, AND 2600 A  | 66. DIAGRAMS  |
|   |   |
| LENGTH CUTOPP FOR EACH REGION, AND THE CHOICE OF PHOTOCATHODE   |   |
| SENSOR GIVES THE BACKE AT WHICH THE SIN'S RAYS STRIKE THE DIDDES  |   |
| WITH 7 BIT ACCURACY, USABLE DATA IS OBTAINED OVER A 100 DEG FOV.  |   |
| THE RADIATION INTENSITY IS READ AS THE CURRENT PROM THE PHOTO-  |   |
| DIODES BY ELTHER OF 2 PARALLEL ELECTRORITERS WITH 4 DECADE RANGES. THERE IS AN AUTOMATIC ZERO SETTING DEVICE FOR THE RIECT      |   |
| CONSTANT  |   |
| PLIED BY A RADIOACTIVE SOURCE (AM 241). AN EXPERIMENT CYCLE   |   |
| TAKES 48 SEC INCLUDING CALLERATION CHECKS, HOUSENEEFING CHECKS AND SENSOR DATA, EACH SENSOR IS MONITORED FOR 5 SEC PER CYCLE.   |   |
| THIS DATA WILL BE CORRELATED WITH DATA PROM THE BUY EXPERIMENT  |   |
| TO HELP UNDERSTAND THE SOLAR INPLUENCE ON THE STRATOSPHERE, THE ARCOLUTE ACCURACY OF THE MPACHEMENTS UTIL AR 30 DERICENT.       |   |
|   |   |
| ULTRAVIOLET SOLAR RADIATION PLUX  |   |
| SIGNAL CUBRENT PROM 0.1 NANOAMP TO 100 NANOAMPS   |   |
|   |   |
| (ADSOLUTE ACCURACT OF FLOX BEASONEDER, MILITA ZO PERCENT  |   |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | 39. SPECTRAL KANGE 13. SPECTRAL FESOLUTION -37. TIME CONSTANT 11. T   |
|--|---|
|  | 32.0 BY 12.5 DEG  |
|  | RESOLUTION'41, SPATIAL RESOLUT  |
| CATILITIES INFRANCE SPECIFICATION STEEL STATES STAT | 12.5 DEG: 130 NO FROM BUO NO ALTITUDE   |
| EL 11/10/69  | MED CIRCULAR  |
| OR 7. ORGANIZATION 8. TELEPI   |   |
| BARK, DR. D.O. NAT ENV SAT CTR, ESSA 301-440-7114  |   |
| ACCE OF THE DESCRIPTION  | COMPOSED MIDDO BY BOLLOMBERDS FIRCTOONING   |
| BER 15. DATE   |   |
|  | .B 2.3 CU PT 30 WATTS   |
| 19. AGENCY 20.PGM OFFICE   | SS. INTERPRESSOR SS. INTERFERENCE   |
| L. B. B. INASA HDQTRS OSSA/SRN 202-962-  | SENSITIVE   |
| 22. VENDOR 24. DATE 25. LEAD TIME  | 59. CALIBRATION 60. DATA RECOVERY 61 FAGUENCY OF DESCRIVATION COUNTY NO. OF THEM 24   |
| 28. INSTRUMENT TYPE  | RECUIREMENTS  |
| 14-CHANNEL IR PASTIE-EBERT FIXED-GRATING   | 15 CHANNELS, ALL SAMPLED WITHIN 100 MILSPC EVERY 2-8 SECONDS.   |
| PLICATION  |   |
| MET NIMBUS D   |   |
| - [  |   |
| DIRENSIONAL  | MOVING PARTS  |
| OF TERFERATIONS, FROM THE GROUND OR FROM CLOUD TOF TO AN ALITTUDE  | A DEFENDANCE  |
| OF 10 10 1 986 10 REASONE SOUR ACE IDENTATIONE OF THE CLOUD-TOP  | INTIGORY SCOROBOTA MERCASONS & Sett & & &   |
| IERPERATURE, AND ITS RELUGI. TO REASONE THE INVESTIGATIONAL DISTRIBUTION OF WATER VAPOR. PROM THE GROUND UP TO ABOUT 6.5 NM.   | I) GALOVP, D.E., SIRS B SUBSISIEM DIRECTORI (FFELTM), GENERAL .<br>ELECTRIC CO., PHILADRIPHIA, PA., DEC. 1957.***2) GOLDBERG, I.: |
|  | AT 1  |
| 31. PRINCIPLES OF OPERATION  | (ED)  |
| NIMBUS B2 SIRS,  | ATELLITE METEOROLOGICAL INSTRUMENTS.  |
|  | PM-6713, JUNE 1967.   |
| LOUING FEATURES: (1) A PLANE, LIGHT-COLLECTING MIRROR TO PROVIDE   | 65. HISTORICAL REMARKS  |
| DOME PIXED AND TWO VARIABLE RAKIN-VISHING ANGLES; (2) A BALANCED DOMESTED CHARGES ATTRONOMYTHMS WILL TO COLLECT  | SW DIAGRAMS   |
| ROTATION CHOKELING BIRDACH MILLOR SENVED: ADIEDRALITEDIA OF COLCECT.   | Co. Chachand  |
| JEACH BACKET TRUCKS AND LEGIC IN A 2 STAINT WITH 1250 ILLINGS OF   |   |
| CALADOM CONTRACTOR OF THE CALADAM CONTRACTOR |   |
| INTERPREPARED THE STATE OF THE  |   |
| OR SIMILAR THERMISTOR BOLOMETERS: AND (6) A BLACKBODY RADIATION  |   |
| SOURCE FOR CALIBRATION PURPOSES. THE 15 MICRON RADIATION DATA  |   |
| IS TRANSPORMED INTO A SINGLE TEMPERATURE-PRESSURE PROFILE BY A   |   |
| MATHEMATICAL INVERSION TECHNIQUE, A SIMILAR RELATED TECHNIQUE  |   |
| TIBLOS THE ALTITUDE PROFILE OF WATER VAPOR FROM THE 18 TO 35   |   |
| THE CONTRACTOR DAILS CONFRICT ON THE CONTRACT OF THE CONTRACT  |   |
| NTERED AT  |   |
| 95, 18.82,   |   |
| ACCUMULATED IN 6 3   |   |
| TERVALS TO GIVE PROPILES EACH 50 MILES ALONG THE STRIP.  |   |
| 32. PHENOMENA OBSERVED   |   |
| IN RADIATION EDITIED FROM THE EARTH'S ATROSPHERE.  |   |
| 40 TO 190 ERG/SEC/SQ-CH/STERADIAN/WAVE-NO  |   |
| 34, PRECISION AND ACCURACY   |   |
| TEMPERATURE PLUS-FIRNDS 1 DEG K.WATER VAPOR TO +-1 PERCENT.  |   |
|  |   |

| INSTRUMENT RESUME NATIONAL AEPONAUTICS AND SPACE ADMINISTRATION   | 14.5 TO 15.0 MICRONS 0.2 PERCENT,  |
|---|--|
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE MASSACHUSTTS   | OF VIEW 39. GROUND SWATH   |
| 1. TITLE  | 10. DEGI STATIST OF SPATIAL RESOLUTION TO THE CINCLE FROM 6.00 NM ALTITUDE   |
| E CHOPPER RADIOMETER  | NM ALTITUDE  |
| (TITLE CONT.)   | 45. INCLINATION  |
| 8. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE  | 46. SPECIAL REQUIREMENTS   |
| ERSITY, ENG.  | THIR DATA REQUIRED FOR CALCULATIONS OF VERTICAL TEMP PROFILES  |
| DEADLING THERESETTY SNC   | 2 DANTOMETREDS MIDDOD DEMECTION BIDGEDONICS  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATUS  | ME SO AVERAGE POW  |
|   | 34 LB 0.5 CU PT 5 HATTS  |
| 19. AGENCY  | 64. INTERPRESENCE 55. INTERPRESENCE 56. INTERPRESENCE 57. INTERPRESENCE 198. SHIELDING   |
| 22 VENDOR 24 B. B. B. INASA HDOTRS I USSA/SKNI 202-902-0891   | 58. CALIBRATION 60. DATA RECOVERY '61. FREGUENCY OF OBSERVATIO   |
| 03/70   | EQUENCES DELAYED TELEMETRY   |
| 36  |  |
| RADIOMETER, 3 DUAL-CHANNEL INFRARED   | 6 CHANNELS SAMPLED ONCE EACH SECOND WITH ONE-HALF PERCENT  |
|   | ACCURACI   |
| POSE  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY- TO DETERMINE THE THREE-DIMENSIONAL TEMPERATURE STRUC-  | ~  |
| ABSORPTION BAND OF CO. ON A GLOBAL BASIS BETWEEN THE GROUND OR  | LNIERFERUNKIERS. LINIED TO ABOYE CLOUDS. 64. REFERENCES  |
| HIGHEST CLOUD TOP AND 50-KM ALTITUDE.   | S.W., SCR SUBSYSTEM  |
|   | TRIC CO., PHILADELPHIA, PA., FEBRUARY 1968. ***2) MINZNER, R.A.:   |
| 3). PRINCIPLES OF OPERATION   | INTERIOR REPORT ON SATELLIE SETECNOLOGICAL INSTRUMENTS. NASANER PREDORT NO. DM-6713. JINE 1967. ***NGOLOBERG. T.I. MRT IN INSTRU |
| THE INSTRUMENT HAS 6 CHANNELS, EACH WITH A PIELD-OF-VIEW OF 10  | MENTS FOR SATELLITES, PRESENTED AT 13TH ANN TECH SYMP OF SPIE,   |
| DRG AND ARE ARRANGED IN 3 UNITS OF 2. THE BASIC SPECTRAL SELEC-   | AUG. 196, 1968   |
| TION IS ACHIEVED BY INTERPREDICE FILTERS OF 2 TYPES, THREE CHAN-  | 65, HISTORICAL REMARKS   |
| URLS USE FILTERS 4 INV. CM. FIDE, AND 3 USE FILTERS 10 INV. CM.   | 6 DIAGRAMS   |
| THISTER FOR THE MARKON DAND CHANNELS, A TECHNIQUE OF SELECTIVE CHOOSING RY TOO IS HAVE TO PERFORM DELIVERING HE ENERGY COLLECTIVE | Co. Cr. Cr. Cr. Cr. Cr. Cr. Cr. Cr. Cr. Cr   |
| ED. THE PILIERED RADIATION IS SWITCHED BETWEEN A CELL CONTAIN-  |  |
| IIS PERMITS ONLY  |  |
| SORBED BY CO2 TO BE CHOPPED. BY THIS MEANS, THE ENERGY COLLECT-   |  |
| ED IS EQUIVALENT TO THAT PROM AN INTERVAL OF 1.3 INV. CM. IN 2  |  |
| 2 AT VERY LOW   |  |
| EMPTY CRIL. TEMPERATURES CAN BE OBTAINED UP TO HEIGHTS OF 27 NM   |  |
| DSING THE WEIGHTING PUNCTIONS. POR LOWER ALTITUDE MEASUREMENTS HETCHT REALTHION IS INCREASED FOR THE REMAINING 1 NARROW AND 3     |  |
|   |  |
| SYSTEM CONSISTS OF A MOVA!  |  |
| GIRBOR, CHOPPERS, GERBANIUM LENSES, PILTERS, AND A LIGHT PIPE TO COMPENSE BENTANTON ONTO A THEOMYCHOP ROTORFTER THE CHIPMIT OF    |  |
| 107100 7111   |  |
| 42. THENOMICAL OBSERVED.  |  |
| AR BALLAUM ENLITED INON THE BANANTS ATROSEREDE<br>33. MEASUREMENT RANGE   |  |
|   |  |
| TAL PRECISION AND ACCURACY TO MICO BEALTRE TO ALL TOPE OF ALTONIAND TO ALL TO METERS  |  |
|   |  |

RETROGRADE

| INSTRUMENT RESUME  NATIONAL AERONOS REGEARCH CENTER  CAMBRIDGE, MASSACHUSETTS  TEMPERATURE/HUMIDITY INFRARED RADIOMETER  THILE  | 18. SPECTRAL RESOLUTION 12.5 MICRONS 18. FIELD OF VIEW  SEE ITEM 31 SEE ITEM 3 |
|---|--|
| NESTIGATOR 7. OFGENIZATION 8.TELEPHONE 8.TELEPHONE 1. A.W. GODDARD SPACE PLT CENTER 301-982-4347  | MED CIRCULAR   |
| 10. ORGANIZATION<br>GODDARD SPACE PLT CENTER<br>CT NUMBER 14. FLASH INDEX NUMBER 15. DATE   | 1NTERFERENCE FILTER RADIOMETER, ELECTRONICS, MIRRORS, TELESCOPE 48. WEIGHT 49. VOLUME 50. AVERAGE FOWER 51. STANDBY FOWER 52. PEAK POWER 53. MIRE  |
| 18 ACHARDT, B. B. NASA HDQTRS 0SSA/SRN 202-962-0891 22 VENDOR  22 VENDOR  23 LOCATION  24 FURTH 25 LEAD TIME  | U LBI U U S U PTI<br>PP WAGNETIC<br>SERATION   |
| 26 INSTRUMENT TYPE  RADIOMETER, 2—CHANNEL IR HIGH-RESOLUTION SCANNING  ONC  NEW SPRICE OF THE STANDING   BLK BODY AND COLD SPACE DELAYED AND RPALTIME CONTINGOUS 82. TELEMETRY REQUIREMENTS 63.0 HZ INFORMATION BANDWIDTH   |
| O PROVIDE NIGHT AND DAY TIME RILOUDS, LAND, AND OCEAN SURFACE PROVING SYNOPTIC HIMIDITY PATTY   | 63. ADVANTAGES AND LIMITATIONS BETTER S/N THAN HAIR, CAN GIVE CIRRUS CLOUD CONTENT; LIMITED TO CLOUD-TOP DATA 64. REFERENCES   |
| HASS BOUNDARIES, VERNICAL MOTIONS AND JET STREAMS.***TERTIARY— TO PROVIDE SUPPORTING DATA FOR OTHER EXPERIMENTERS.  THIS PRINCIPLES OF OPERATION THIS RADIOWETER LIKE THE HRIR IS A SCANNING RADIOWETER, THE SCAN TS ACCOMPLISHED BY A PLANE WIRROR ROTATING AT MR RPM. RADIARTON   | 1) KAHN, W.: THIR SUBSYSTEM DIRECTORY (PRELIM), GENERAL ELECTRIC CO., NOV. 1967.***2) GOLDBERG, I.L., METEOROLOGICAL INPRARED INSTRUMENTS FOR SATELLITES. GIVEN AT 13TH ANNUAL TECH. SYMP. OF SOC.PHOTO-OPTICAL ENGR., AUG 19-23, 1968.***3) NIMBUS D EXPERIMENTER PROGRAM REVIEW, 25-26 OCT. 1967.  |
| PROM THE SCANNING MIRROR IS COLLECTED AND FOCUSED BY A CASSEGRAINIAN TELESCOPE WITH A 5 INCH PRIMARY MIRROR. A DICHROIC BEAM SPLITTER AND FILTERS THEN DIVIDE THE BEAM INTO 2 CHANNELS, A 6.5-7.0 HICRON CHANNEL POR WATER VAPOR MESUREMENTS AND A 10.5-10.5 HICRON CHANNEL POR SUFFACE OR CLOUD TOP TEMPERATURE MEASUREMENTS. IMMERSED THERMISTOR BOLOMETERS ARE THE DETECTORS IN BOTH CHANNELS. DURING A SCAN PERIOD OF 1.25 SEC, THERE IS A SYNC   | 66. HISTORICAL REMARKS SINILAR TO HRIR 68. DIAGRAMS  |
| SIGNAL, A STEPPED VOLTAGE CALLEGATION SIGNAL, A SCAN OF COLD SPACE FOR A ZERO LEVEL, THE SCAN OF EARTH, ANOTHER SPACE SCAN, AND A HOUSING SCAN TO GIVE A WARN BODY CALIBRATION POINT. THERE IS NO RADIATION CHOPPING IN THIS INSTRUMENT. THE SWEEP RATE AND THE FIELD OF VIEW ARE CHOSEN SO THAT CONTIGUOUS SCANNING OCCURS HONG THE SUBSAFELLITE TRACK WITH INCREASING OVERLAP TOWARD THE HORIZON. THE 11 MICRON CHANNEL HAS A 0.4 DEG (7.0 MILLIRAD) FOV WHICH GIVES A 4.2 NB RESOLUTION FROM A 600 NM ORBIT. THE 6-MICRON CHANNEL HAS A 1.2 DEGREE (21 MILLIRADIANS) FIELD OF VIEW GIVING A 12.6 NM RESOLUTION FROM A 600 NM ORBIT.  |  |
| 32. PHENOMENA OBSERVED  IR RADIATION PROM THE BARTH'S SURFACE AND CLOUDS.  33. MEASUREMENT RANGE  185 TO 300 DEG KELVIN  34. PRECISION AND ACCURACY  4-7 K DEG  |  |

| 2   | INSTRUMENT RESUME   | 35. SPEC       |
|---|---|----------------|
| NATIONAL AER<br>ELE<br>CA                 | AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS SPESARCH CENTER CAMBRIDGE, MASSACHUSETTS                           | 38. FIEL       |
| 11  | 2. ACHONYM 3. EXP NO  | 40.ANGUL       |
| ELECTRICALLY-SCANNING MIC                 | MICROWAVE RADIONETER 2. RESUME   S. VERSION   | 1              |
|   | 69/   |                |
| TOR                                       | 7. ORGANIZATION . B. TELEPHONE  | 46. SPEC       |
| NO RDBERG DR. W. GODD                     | GODDARD SPACE PLT CENTER 301-982-5003   | 43             |
| 98.0                                      |   |                |
| CT NUMBE                                  | ART 118.COUPLETION 17. STATUS   | 148. WEIG      |
|   |   | 5.             |
| SCHARDT, B. B. NASA H                     | DCTRS OSSA/SRN  | SENS           |
|   | 3 LOCATION  | 59. CAL!       |
| SPACE GENERAL CORP                        | EL MONTE, CALIFORNIA 06/72 30 MONTHS  | TWO<br>62, TEL |
| 19.35-GHZ                                 | ROWAVE  | 10<br>B        |
| MET, GEOP, OCRAN                          | AI STACECHARI   |                |
|   |   | 63. ADV,       |
| TO MAP GLOBALLY                           | NTINUOUSLY THE THE  | HIGH           |
| 19.35 GHZ. *** SECONDARY                  | THE PEASIBLE  | 64. REF        |
| DEPLOYED PHASED-ARRAY ANTENNAS.           |   | 1) NC          |
|   |   | GSFC           |
| 31. PRINCIPLES OF OPERATION               |   | FLIG           |
| THE RADIOMETER WILL BE US                 | RADIOMETER WILL BE USED TO MEASURE PRECISELY THE INTENSITY to 35 CH7 MEDDMAN DADIAMION MED UTBELLO DIDECTION OF THE | NASA           |
|   | 3681  | 65. HIST       |
| THE NADIR NORMAL TO THE SPACECRAPT GROUND | TRACK, PRODUCING  |                |
| BRIGHTNESS TEMPERATURE MAP OF THE SURP    | POP THE SURFACE OF THE EARTH AND ITS  | 26 DIAC        |
|   | LED BY AN I   |                |
|   | SEPARATION OF VIEW POSITIONS ALLOWS AN 8.5 PERCENT  |                |
| CALIBRATION IS ACHIEVED W                 | HAL IERPERATURE HUST BE REASURED.   | _              |
| DEGREES KELVIN, THE OTHER                 | (A SPACE-   |                |
| VIEWING HORN). THE 90 BY                  | 90 BY 90 CENTIMETER ANTENNA IS DEPLOYED AFTER THE ANGILAR RESOLUTION OF THE ANTENNA WILL BE                         |                |
| ES AT THE                                 | STING AND 1.  |                |
| EGREES AT THE MAXI                        | SITIONS OF PLUS AND MINUS   |                |
| DEGREES.                                  |   |                |
| 32. PHENOMENA OBSERVED                    |   |                |
| HORIZONTALLY POLARIZED TE                 | TELLURIC THERMAL EMISSIONS AT 19.35 GHZ   |                |
| DY NAMIC TEMPERATURE RANGE=               | := 50 TO 330 DEGREES K  |                |
| 34. PRECISION AND ACCURACY                | C 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2   |                |
| RMS TEMP WITHIN 0.5 DEG K:                | . ABSOLUTE TEMP WITHIN 2 DEG K  |                |

| EXP NO 44 3                                   | of view GHZ 3.10 PERCENT  |
|---|---|
|   | A LA STORY OF THE |
|   | 100. BY 1.4 DEG 1400 KM BY 15 KM FROM 600 KM ALTITUDE   |
|   | JAR RESOLUTION 41, SPATIAL RESOLUTION   |
|   |   |
|   | 45. YOUR DIVE DE  |
|   | 10115 100   |
|   |   |
| <u></u> 1                                     |   |
| _13   | TER, RECEIVER, ANTENNA, CALIBRATION TEMPERATURE SOI   |
| - L.  | al. at Anual Tower  |
| 2000  | THE SECTION OF THE SECTION OF SEC  |
| , <u>, , , , , , , , , , , , , , , , , , </u> | INTERFERENCE TO INTERFERENCE TO INTERFERENCE  |
|   | SENSITIVE SENSITIVE NONE SENSITIVE INTEGRAL   |
| Į v   | Securios acreada co   |
|   |   |
| .L  | 10 BIT WORD READ BACH 25 MILLISECONDS. SERIAL READOUT.  |
| <br>-[  |   |
| 10  | G. ADVANTAGES AND I MITATIONS   |
| 7   |   |
| Y OF  | SECENT, ANTENNA DESIGN AND DEPLOYMENT MOST CRITICAL   |
| 9   |   |
|   | 1) NORDBERG, W.: PROPOSAL FOR MAPPING EARTH RADIATION AND CLOUD   |
|   | SCANNING MICROWAVE  |
|   | LNAKI RESULTS FROM AIRCRAFT   |
| LTY   | AUG 67. ***31   |
|   | FLIGHT  |
| FROM  | 65. HISTORICAL REMARKS  |
| C F   | SWY CO DIVISION   |
|   |   |
| MPU-  |   |
| CENT  |   |
| 85.   |   |
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|  | INSTRUMENT RESUME  | 35. SPECTAAL BANGE        |
|--|--|---------------------------|
| NATIO  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  | 11.0                      |
|  |  | 74. BY 2                  |
|  |  | AR RESOLUTIONIST.         |
| INPRARED TEMPERATURE-PROFILE   | 2-PROFILE RADIOMETER 206   | 2.5 DEG 26                |
|  | 769  | 42, rointing accorded.    |
| 6. PRINCIPAL INVESTIGATOR  | 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL REGULAEMENT   |
| SHITH, W. L.   | ENVIRON SCI SERV ADMIN   | 15 AUXILIARY TE           |
| 9, CO-INVESTIGATOR   | 10. ORGANIZATION 11. TELEPHONE   | 47. COMPONENTS            |
| WARK, D. O.  | NVIRON SCI SERV ADMIN  |                           |
| 12. TYPE 13. CONTRACT NUMBER   | Т  | 48. WEIGHT 49. VOLUME     |
| 18. MONITOR  | 19. AGENCY 20.PGM OFFICE 21. TELEPHONE   | 54. NTGREBONGE SB. INTERE |
| SCHARDT, B.  | OSSA/SAN 202-962-  |                           |
|  | Z4. DATE   | 55. CAL. BEATION          |
| 26. INSTRUMENT TYPE  | AES CENTER GULETA, CALIFORNIA  | 1 22. TELEMETRY REQUIREN  |
| RADIOMETER, 6-CHANNEL STEP-SCANNING  | INPRARED (MODIFIED MRIR)   | IR DATA - 6 10-           |
| 28. APPLICATION  | AFT  | 10-BIT CHANNEL;           |
| Talk   | NIMBUS E   | MINUTES WITH 1            |
| 9  | BUT TO BANTAMON UNITED TO DO CANADA OF MA TOCK   | NO SWOTH WAS SOO          |
| 2 2  | -  | ATHRE PROFILE             |
| TEMPERATURE SOUNDER*   | SOUNDER***SICONDARY-TO DEVELOP A TECHNIQUE FOR DE-   |                           |
|  | THREE-DIMENSIONAL TEMPERATURE AND MOISTURE OF THE ATMO-  | 1) SMITH, W.L.:           |
| SPHERE FOR OPERATIONAL PORECASTS   | IAL PORECASTS BY THE MID 1970'S.   | DITY PROFILES W           |
| 100 1100 100 100 100 100 100 100 100 10  |  | ESSA PROPOSAL,            |
| THINCIPLES OF OPERATION  |  | CONTRACT NASR-5           |
| CODO ELICOR C SUCREN   | THE ABOUTH CORREST TO DELING DESTEONED ALONG THE GENERAL LINES OF THE NAMED A SERVICE OF THE   |                           |
| CER CHARANT SAUCH  | MERSONE INPRESED PARIATION EMITTED PROMITER EARTH IN FOUR SORCE  | 65. HISTOR, CAL. REMARKS  |
| TRAL INTERVALS IN TH   | ONE  | SIMILAR TO THE            |
| VAL IN THE ROTATIONA   | VAL IN THE ROTATIONAL WATER VAPOR BAND AND ONE INTERVAL IN THE   | 66 DIAGRANS               |
| 11.1-HICRON WINDOW.  | 11.1-HICRON WINDOW. IT WILL VIEW THE BARTH SUCCESSIVELY AT 29  |                           |
| DIPPERENT VIEWING AN   | DIPPERENT VIEWING ANGLES DISTRIBUTED SYMMETRICALLY ABOUT EITHER  |                           |
| SIDE OF THE NADIR AN   | ND IN A PLANE PERPENDICULAR TO THE SUB-ORBIT-  |                           |
| AL TRACK. 29 GEOGRAP   | AL TRACK. 29 GEOGRAPHICALLY INDEPENDENT RESOLUTION ELEMENTS WILL   | _                         |
| SK REASURED IN A SIN   | SOLE STRIP. AS THE SATELLITE ORBITS, THE RA-   | • • •                     |
| ALTERNATION NATIONAL DESCRIPTION OF STREET, ST | DIODELDS WILL DESTREE 24 OF 1850E DIALED BRUD 1800 FORD A 29 A 29 EMBLEDIA CONCINENT DESCRIPTION DISERBREE SEUD  |                           |
| DATA PROM THE 29 X   | X 24 MATRIX WILL THRN BY HARD TO DERIVE THE  | -                         |
|  |  |                           |
| AREA BY INVERTING TH   | THE RADIATIVE TRANSPER EQUATION USING NUMERI-  |                           |
| CAL AND MATBEMATICAL   | CAL AND MATHEMATICAL TECHNIQUES. THE STATISTICAL PLUCTUATIONS OF   | •                         |
| THE RADIATION DATA P   | THE RADIATION DATA PROM THE INDEPENDENT RESOLUTION ELEMENTS WILL   |                           |
| BE UTILIZED IN THE S   | SOLUTION TO ACCOUNT FOR THE ATTENUATION OF   |                           |
| THE BEASURED RADIATION   | ION BI CLOUDS. THE DATA ACCUISITION PERIOD BY ABOUT A 1 MINUTES  |                           |
|  | about 4.   | ~ <i>.</i>                |
| IR ENERGY EMITTED PR   | IR ENERGY EMITTED PROM THE SURFACE AND ATMOSPHERE OF THE CARTH   |                           |
| SOUND SOUND OF THE PRINCE OF T | Relation to the state of the st |                           |
|  | // Sec/ Steamblan  |                           |
| BETTER THAN 0.3 ERG-   | BETTER THAN 0.3 ERG-CM/SQ-CM/SEC/STERADIAN   |                           |
|  |  |                           |

| . AANGE  | 36. SPECTRAL RESULUTION 37. TIME CONSTANT |
|--|---|
| 22.0   |   |
| SWATH  |   |
| PNO 42. AND HESSELUTION SPATIAL RESOLUTION                                   | FROM SOU NM ALTITUDE                      |
| 2.5 DEG 26 NM FROM 600   | ω.  |
| THEON 1 42 POINTING ACCURACY AS POINTING RATE 144 ALTITODE                   | St. INCLINATION                           |
| 46. SPECIAL REGUIREMENTS   |   |
| IARY TEMPERATURES AND VOLTAGES   | MONITORED                                 |
| 47. COMPONENTS  14. DADIOMETER UTTH ASSOCIAMED OBTICS DITIS EL               | ELECTIONIC DACKAGE                        |
| 48. WEIGHT '39. VOLUME NO AVERAGE POWER IN STANDSVICWIA 'CO. PEAK POWER   33 | INDER POWER 'S2, PEAK POWER S3, MISE      |
| SGN 35 I.B 0.84 CU PT 25 WATTS   | SAIO CHE CHE CONTRACTOR                   |
| ()<br>T  | ဥ   |
| SS. CAL. BAATION   | 161, FREQUENCY OF ORSERVATION             |
| THS BLACK BODY: SPACE VIEW DELAYED TELEMETRY                                 | ETRY CONTINUOUS                           |
| IR DATA - 6 10-BIT CHANNELS 4  | BLACKBODY -                               |
| NINUTES WITH 1 PER CENT ACCURACY.  | na:                                       |
| .03. ADVANTAGES AND LIMITATIONS  |   |
| KEN CLOUDS MAY BE  | USED TO DETERMINE TEMPER-                 |
| STORE FUCE LABORAN TO GROUND: HOVING FAMILION OF REFERENCES                  | BRID                                      |
| MEASUREMENT OF   | BRIC TEMPERATURE AND HUMI-                |
| ILES WITH AN INFBAR  |   |
| FEB 68.***2) CH  | AL: TECH REPORT UNDER                     |
|  |   |
|  |   |
| DE HISTORICAL REMARKS  |   |
| SE DIAGRAMS  |   |
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| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  | NA NA NA NA   |
|--|---|
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS  | 135. FIELD OF VIEW 39. GROUND SWATH M.A. N.A. N.A.  |
| 1, TITLE 2. ACRONYM 3. EXP NO  | 40. ANGULAR RESOLUTION 41, SPATIAL RESOL  |
| ÞΣ   | NA NA   |
| 11 / 10 / Kg   0005  | N. N. A. POINTING ACCOUNTS  |
| ٦ :  | 46. SFECIAL REQUIREMENTS  |
| GODDARD SPACE PLT CENTER   | EXTERNAL NOUNT, FORWARD LOOKING IN TERMS OF SPACECRAFT MOTION   |
| 10. OHGANIZATION   | 4. COMPONENTS   |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. ONTRACT 13. CONTRACT 15. CONTRACT 15 | 14 MECCULLECTUR, KLECTRONICS<br>148 WEIGHT 49, VOLUME 50 AVERAGE POWER 91, STANGBY POWCH 22, PEAK POWER (N.) MYBR |
| 01/69  | 3 LB 0.15 CU PT 2 WATTS NONE 2 WATTS.   |
| 19. AGENCY 20.PGM OFFICE   | SHIELDING   |
| SCHARDT, B. B. B. INASA HDOTRS   OSSA/SRN   202-962-0891   | 1 NONE NONE NONE NONE NONE NONE IN PRACTICAL PARTIES OF SECRETARIES   |
| 06/72  | CURRENT DELAYED TELEMETRY   |
| 26. INSTRUMENT TYPE 165.0.   | 62. TELEMETRY REQUIREMENTS  |
| COUNTER, ELECTROSTATIC CYLINDRICAL PLASMA ELECTRON CURRENT UNC 28. APPLICATION   | 4 CHANNELS AT 5 WORD/SEC; 6 CHANNELS AT 1 WORD/SEC; 2 CHANNELS AT 1/16 WORD/SEC.                                  |
| PLAN-ATR   |   |
|  | ANTAGES AND LIMITATIONS   |
| PRIMARY-TO REASURE THE LONG PERIOD VARIATIONS IN ELECTRON TEN-   | THE NIMBUS ORBIT IS UNIQUELY SUITED FOR IONOSPHERIC MEASUREMENTS  |
| 1  | 64. REFEKENCES  |
|  | POSAL FOR   |
|  | 2   |
| 31. PRINCIPLES OF OPERATION  | . V. 69. 44.86. 1964. ***3) MAYR. H. G. FT AL. J.G. R. V. 72. 4391.   |
| THE UPPER IONOSPHERE IS HEATED IN THE DAYTIME BY PHOTO ELECTRONS   | 1967. *** 4) BRACE, L.H., ET AL, J.G.R., V. 72, 265, 1967.  |
| WHICH ESCAPE THE LOWER IONOSPHERE, AT HIGHER LATITUDES THE IONO-   |   |
| SPHERE MAY ALSO BE HEATED BOTH DAY AND NIGHT BY PARTICLE PRECIPA-  | 69, HISTORICAL NEWARKS  |
| : 👱  | 66. DIAGRAMS  |
| TIME OF DAY  |   |
| ES AND THEIR SPAT  |   |
| T THE CONTINUOUS   |   |
| TION OF THE SEASONAL AND 27 DAY COMPONENTS OF THIS VARIATION.  |   |
| THE EXPERIMENT CONSISTS OF A LONG, THIN WIRE COLLECTOR THAT IS   |   |
| MOUNTED ON A FORMARD LOOKING EXTERIOR SURFACE OF THE SATRLITE.  A SAMPOOTH VOLTAGE IS APPLIED TO THE COLLECTOR (-3 TO +5 VOLTS)  |   |
| AND THE RESULTING ELECTRON CURRENT PROM THE PLASMA IS INTERPRE-  |   |
| TED IN TERMS OF ELECTRON TEMPERATURE AND CONCENTRATION. TWO COLLECTORS MAY BE USED FOR CALIBRATION PURPOSES.   |   |
|  |   |
| 32. PHENOMENA OBSERVED   |   |
| ELECTRON CURRENT FROM THE PLASMA   |   |
| NO OF ELECTRONS = 10 TO 100,000/CC; TEMP = 500 TO 10,000 DEG K   |   |
| 2  |   |
| NO OF ELECTRONS WITHIN S PERCENT; TERFERATORE WITHIN TO PERCENT  |   |

| INSTRUMENT RESUME  | 35-SPECTH   |
|--|-------------|
| NATIONAL AEROMAUTICS AND SYACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MANSSACHUSETTS  | 38 FIELD C  |
| 2 ACRONYM  | 40.ANGULAR  |
| HICROHAVE SPECTROMETER   | CALLEGE CO. |
| 11/10/69   | 100         |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL |
| TAELIN, DR. D.H. MASS INST OF TECHNOLOGY   | CALIBE      |
| DR 10. ORGANIZATION  | 47. COMPON  |
| BARATH, P. T., RT AL JET PROPULSTON LAB 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. CONTRACT 15. CONTRACT 16. CONTRACT 16. CONTRACT 17. CONTRACT 16. CONTRACT 17. CONTRACT 16. CONTRACT 17. CONTRACT  | RADIOM      |
| 01/69  | 50          |
| 19. AGENCY 20. PGM OFFICE  | 54, INTERPE |
| 22. VENDOR 12. LOCATION 12. LOC | SENSIT      |
| ON LAB PASADENA, CALIFORNIA 06/72  | REFERE      |
| 26. INSTRUMENT TYPE DARTOWN MICDOUNES CINEDIAN MICDOUNES TINE  | 62. TELENIE |
| 29. SPACECHAFT   | 20          |
| NET NIMBUS E   |             |
| PRIMARY- TO DEMONSTRATE THE CAPABILITIES AND LIMITATIONS OF  | TECHNI      |
| IG TROPOSPH  | FORMAT      |
| AND CLOUD  | 64. REFERE  |
| UPBHHED DOBNICHTON DIRDORS PADECIALLY OVER CIONALOURD  | 0 PRO (L    |
| WT 10 17 17 17 17 17 17 17 17 17 17 17 17 17   | PHD TH      |
|  | (1966)      |
| THE INSTRUMENT, VIEWING THE NADIR CONTINUOUSLY, WILL MEASURE THER-   |             |
| IM OXY   | 68, HISTOR  |
| VAPOR RESONANCE BANDS. EACH PREQUENCY IS AFFECTED TO A DIPPERENT   |             |
| URGREE BY THE TERRESTRIAL SURFACE, CLOUDS, PRECIPITATION, MATER-   | Pec DIACAN  |
| MARCH, AND IEMPERATURE PROFILE. ISROUGH CAREFUL INTERPRETATION, MOST OF THESE METEOROLOGICAL PARABETERS CAN BE SEPARATELY ESTI-  |             |
| MATED. THE THREE CHANNELS NEAR 5-MM PRIMARILY MEASURE THE VERTI-   | ·           |
| CAL ATMOSPHERIC-TEMPERATURE PROFILE, THE TWO CHANNELS NEAR 1.0-  |             |
| CONDAND PERMIT WATER-VAPOR AND CLOUD-WATER CONTENT OVER THE  |             |
|  |             |
| TO WATER-VAPOR, OVER   |             |
| WATER-VAPOR CHANNELS WILL YIELD AN ESTIMATE OF SURFACE TEMPERA-  |             |
| SON WITH DIRECT TEMPERATURE MEASUREMENTS, THE THREE OXYGEN RADI-   |             |
| OMETERS SHARE A COMMON SIGNAL ANTENNA AND A COMMON REFERENCE AN-   |             |
| PENNA. BOTH WATER-VAPOR RADIOMETERS HAVE THEIR OWN SIGNAL AND DEPREDENCE ANTENNAS THE DANIOMETERS ARE CALTERIATED BY SECREBALIA  |             |
| HE SIGNAL, REFERENCE, AND BLACK-BODY.  |             |
| 32. PHENOMENA OBSERVED   |             |
| ATMOSPHERIC AND SURPACE RADIATION IN THE 1-CM BANDS 33. MEASUREMENT RANGE  |             |
| RACIANT TEMPERATURE PROM O TO 400 DEGREES KELVIN   |             |
| WAS THE LINE ALL MANDER OF A CHARGO OF A CHARGO OF CHARGO OF   |             |
| TERF-2 DEG N. MATER-VAPOR-U. 1 GR/SQ CR. CLOUDS-U.O4 GR/SQ CR  |             |

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|-----------------|--|
|                 | 38 FIELD OF VIEW 35 GROUNDSWATH SPECIAL OF VIEW ATTENTION OF A STATEMENT OF A STA |
| ON AX           | HESOLUTION AT SPATTAL RESOLUTION   |
| VEHSION<br>0005 | 43. POWTING ACCUMATION  1.0 DEG/SEC NED HTGH   |
| 1711            | AND STATEMENT OF THE PROBLEM OF THE STATEMENT OF THE STAT |
| TT              |  |
| SGN             | RECEIVED 1.33 CU FT 35 WATTS NONE 40 MATTS   |
| Z.              |  |
| ITHS            |  |
| UNC             | 60 BPS   |
| 7               | 63. ADVANTAGES AND LIMITATIONS   |
|                 | TECHNIQUE IS NOT LIMITED TO SUN ANGLE CONSIDERATIONS OR CLOUD  |
|                 | 64. REFERENCES   |
|                 | . POR MICROWAVE SPECTROMETER, FEB 68.***2) MEEKS, A.E.: J.G.R. V.68, P.1683, (1963). ***3) LENDIR, W   |
|                 | THESIS MIT, (1965).***4) STAELIN, D.H.: J.G.R. V.71 P.2875   |
| ER-             |  |
| RR-             | 68. HISTORICAL REMARKS   |
| ENT             |  |
| N K             | 90. UTACHAMS   |
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| 1. TITLE POSITIVE— (TITLE CONT.) TAYLORA H B. CO.INVESTIG. BRINTON 12. CONTRACT 13. CONTRACT 14. MONITOR   | TON COMI   | AGENDARIO RESUME AGEOMATICES AND SPACE ADDINISTRATIC ELECTRONICS RESEARCH CENTER CAMBIDGE, MASSACHUSETTS  ON SPECTRONETER ODDARD SPACE FLT CENTER OGGANIZATION ODDARD SPACE FLT CENTER AGENCY AS AGENT AND START AS FLASH INDEX NUMBER AGENCY START AGENCY SPACE AGENCY START AGENCY SPACE AGENCY START AGENCY SPACE AGENCY START AGENCY SPACE AGENCY S | 2 ACRONYM 3. EXP NO   PLCS   E31   A RESULE   S. VINDON   S. TELEPHONE   301-982-6610   S. VINDON   S. VINDON | 31. SPECTRAL RANGE   |
|--|--|--|---|--|
| SCHARDT.  22 VENDOR  22 VENDOR  23 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  27 APPLICATION  28 APPLICATION  28 APPLICATION  29 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  21 APPLICATION  22 APPLICATION  23 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  27 APPLICATION  28 APPLICATION  28 APPLICATION  29 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  21 APPLICATION  21 APPLICATION  22 APPLICATION  23 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  27 APPLICATION  28 APPLICATION  28 APPLICATION  29 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  21 APPLICATION  21 APPLICATION  22 APPLICATION  23 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  26 APPLICATION  27 APPLICATION  26 APPLICATION  27 APPLICATION  28 APPLICATION  29 APPLICATION  20 APPLICATION  20 APPLICATION  21 APPLICATION  21 APPLICATION  22 APPLICATION  23 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  26 APPLICATION  27 APPLICATION  27 APPLICATION  28 APPLICATION  28 APPLICATION  29 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  21 APPLICATION  21 APPLICATION  22 APPLICATION  23 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  26 APPLICATION  27 APPLICATION  27 APPLICATION  28 APPLICATION  28 APPLICATION  29 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  21 APPLICATION  21 APPLICATION  21 APPLICATION  22 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  26 APPLICATION  27 APPLICATION  27 APPLICATION  28 APPLICATION  28 APPLICATION  29 APPLICATION  20 APPLICATION  20 APPLICATION  20 APPLICATION  21 APPLICATION  21 APPLICATION  21 APPLICATION  21 APPLICATION  21 APPLICATION  21 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  26 APPLICATION  26 APPLICATION  27 APPLICATION | SCHARDT, B.  22 VENDOR  23 VENDOR  COUNTYPE  23 APPLICATION  24 APPLICATION  25 APPLICATION  26 APPLICATION  27 APPLICATION  27 APPLICATION  28 APPLICATION  28 APPLICATION  29 APPLICATION  ENTH ARY TO INVESTIG  ENTH ARY OF OVERAL PRE  TO BONS INTERPRE  * SECONDART-TO EVAL  * SECOND | SCHARDT, B., INAS, HODGES  SCHARDT, B., INAS, HODGES  SCHARDT, B., INAS, HODGES  SCHARDT, B., INDIRER, GREENBELT, HARTIAND  SA PROCEDIT CENTER, GREENBELT, HARTIAND  SA PROCEDITION  INTERNATIONAL TYPE  SA PROCEDITION  BARN-PLD  | YLAND    A FIGHT   Pa FIGHT   Pa FIGHT  | SECULBATION  SENSITIVE SENSITY FRED RANGE D. 10. 50 DEG.  SOLUTION  SELEMETRY REQUIREMENTS  SOLUTION  SELEMETRY REQUIREMENTS  SOLUTION  

| 0.8                  |
|----------------------|
| 38 FIELD OF VIEW     |
| 40.ANGULAR RESOLUTIO |
| 0.6 DEC              |
| 1 5 1                |
| NA<br>Services       |
| STACTE UTPE          |
| 47. COMPONENTS       |
| RADIOMETER           |
| 148. WEIGHT 49. \    |
| 25 LB                |
| NON P                |
| BRATIO               |
| AT TIMES SEI         |
| 62, TELENIETRY REQ   |
| 7 ANALOGUE           |
| 22 CONNECTS          |
|                      |
| HPPPR I FVEL         |
| ACCURACY. S          |
|                      |
| 1) PROPOSAL          |
| CLOUD, AND A         |
| 4 2                  |
| •                    |
| WITH BALLOOP         |
| 65. HISTORICAL REM   |
|                      |
| 86. DIAGRAMS         |
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|          | RAL RANGE   |
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|          | TO 200.0  |
|          | 23. DEG 48 KM DIAM CIRCLE PROM 1100 KM ALTITUDE   |
| 0        | R RESOLUTION/41. SPATIAL RESOLUTION   |
| т        | 0.6 DEG: 10 KM PROM 1100 KM ALTITUDE FOR CHANNEL 13   |
| 6        | 44. ALTITUDE AS INCLINATION   |
| <u>ب</u> | NA NA SPECIAL MEDUINAMENTS  |
| 7"       | SINGLE VIEW TO EARTH WITH 23 DEGREE CLEAR CONE ANGLE OF VIEW.   |
|          | A) COMPONENTS RADITOMETER GITH ASSOCIATED OBTICS AND BIPCTBONICS DICKICE  |
| 7        | 148. WEIGHT 49. VOLUME. "NA. AVERAGE POWER BI. STANDS YOURS 18. PEAK FOWER 19. MITHE  |
| 2        |   |
| 7        | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING NOWD NOW TO THE STATE OF THE STATE OF THE SHIELDING |
| г        | BRATION GO. DATA  |
| S        | AT TIMES SELECTED DELAYED TELEMETRY   |
| <u> </u> | 7 ANALOGUE CHANNELS WITH HALP PERCENT ACCURACY SAMPLED 1 PER  |
| 1-1      | COND POR RADIOMETERS; 43 ANALOGUE CHANNELS FOR MONITORING   |
| $\neg$   | 33 CHANNELS OF DIGITAL TELEMETRY.   |
| Τ.       | SPHERE CAN BE INVESTIGATED, GOOD RADIC  |
|          |   |
|          | AST SOR SET SET OF CHOOSE BANK AND SOR SANDS  |
|          | FROFOSAL FOR SELECTIVE<br>OUD, AND ATMOSPHERIC TEM  |
|          | IOLOGY TO THE WORLD WEATHER   |
| U        | WATCH, JUN 67.***3) PROPOSAL FOR A SELECTIVE CHOPPER RADIOMETER ON NIMBER D. OVERDED AND DEADING HATT AND AS ***** MANCHOSMENE        |
| •        | BORNE SELECTIVE RADIOMETER, CLARENDON   |
|          | ORICAL REMARKS  |
|          | IS. DIAGRAMS  |
|          |   |
| D.3      |   |
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| 5 N -   | INSTRUMENT RESUME  |                      | 35. SPE  |
|---|--|----------------------|----------|
| NATIONAL AERC<br>ELEC<br>CAN  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS |                      | 38 FIE   |
|   |  | 2. ACRONYM 3. EXP NO | 40.ANGL  |
| SURFACE-COMPOSITION MAPPING   | RADIOMETER   | SCMR B23             | 0 0      |
|   |  | 69/                  |          |
| 6. PRINCIPAL INVESTIGATOR 7. ORGAN  | 7. ORGANIZATION 8. TELEPHONE   |                      | 46. SPE  |
| OCO. NVESTIGATOR  | GODDARD SPACE FLT CENTER 301-982-646   | 2-6465<br>NF         | INST     |
| 2.0   | NIVERSITY  | -1011                | RADI     |
| AACT NUMBE  | 5. START<br>DATE   | S.                   | 48. WE   |
| 18. MONITOR 19. AGENCY  | 20. PGM OFFICE 21. TELEPHO   | PRELIM DSGN          | 54. INTE |
| SCHARDT, B. NASA  | HDOTRS OSSA/SRN 202-962-0891   | 2-0891               | NON      |
|   |  | 9                    |          |
| - 1   |  | SECUPITY             | 62, TE   |
| RADIORETER, INC-CHANNEL SIZE. 28. APPLICATION   | SCANNING INFRANCE<br>29. SPACECRAFT  | 0.00                 | CHA      |
| R SP  | NIMBUS E   |                      | ISI      |
| PRIMARY-TO IDENTIFY VARIOUS   | IGNEOUS ROCK TYPES FROM  | AN ORBITING          | DAY      |
| ECRAFT.   | SURFACE  |                      | BASE     |
|   | SURFACE TEMPERATURES AND ESPECIALLY STRONG SURFACE   | IRFACE TEM-          | 64. REF  |
| RADIORETER TO MEASURE THE   | -  |                      |          |
| CRIALS PROM   | SPACE.   |                      | R.J.     |
| EASURENENT OF THE   | RAHLEN OR RESIDUAL WAVES OF  | Sno                  | 1961     |
| IGNEOUS ROCKS WILL PERMIT   | SCRS WILL PERMIT ROCK IDENTIFICATION, SINCE THE WAVE-  | THE WAVE-            | 65, HIS  |
| ROCK.   | ARE DESCRIBED BY A TERMINOLOGY   | <br>×                | OUT      |
|   |  | THE                  | 86 DL2   |
| GREES C AT CRETAIN WAVELEN  | TEMPERATURE, MEASURED RADIONETRICALLY, BY 12<br>T CRRTAIN WAVELENGTHS, THIS EPPECT CAN BE UT             | BE UTILIZED BY       |          |
| ING SIMUI   | SIMULTANEOUSLY IN TWO CHANNELS, 8.3 TO 9.3 A   | .3 AND 10.2 TO       |          |
|   | IF ONE C   | ANNEL RE-            |          |
| CORDS A LOWER APPARENT RAI  | DIANT TERPERATURE THAN THE<br>DIRE TO A DIPPERENCE IN EMI  | STATE THE            |          |
| OMETER IS A   |  | IRIR FLOWN           |          |
| ON NIMBUS 1 AND 2. THE BA   | A SCAN   | MIRROR FOR           |          |
| SPATIAL SCANNING PERPENDICULAR TO SPACECRAFT  | MOTIC  | IN, A TELESCOPE      |          |
| TO ENHANCE SPATIAL RESOLUTION, INC DEFECTORS PAINTED DEPENDED THE GAVELENGTHS INTERVALS D | K LTH<br>ESTRED  | AND A COOLING        |          |
| THE ROTATING  | MIRBOR IS SPUN AT A RATE SO THAT   | ะร                   |          |
| SCANS ARE CONTIGUOUS, THOUGH THE  | SCAN   | 2                    |          |
| TO HURIZONS DISTURTION AT MISH ANGLES TO THE LIMIT THE USEFUL PORTION OF THE SCAN TO ABOU | T 60   | DEGREES.             | _        |
|   |  |                      |          |
| INPRARED RESTSTRAHLEN (RES  | (RESIDUAL WAVES) OF SURPACE MAT  | MATERIALS            |          |
| TUO   | 10 TO THE TENTH AT 80 DEGREES KE   | KELVIN               |          |
| 34. PRECISION AND ACCURACY  |  | 0.000                |          |
| NOISE EQUIVALENT DELTA T =  | DELTA T =0.17 DEG K AT 280 DEG K AND   | AND TO MICRONS       |          |

|            | 38. SPECTRAL RANGE ONSTANT   |
|------------|--|
|            | 8.3 TO 11.2 MICRONS  |
|            | D OF VIEW  |
| S EXP NO   | ANAMONING SECONDARY SPACE RESOLUTION   |
| F23        | TOWNS THE STATE OF |
| 5. VERSION | 44. ALTITUDE   45. 1   |
| 69 0005    |  |
|            | REMENTS  |
| 5          | INSTRUMENT WILL REQUIRE A CLEAR DERP SPACE VIEW  |
|            |  |
| 1138       | RADIOMETER, TELESCOPE, COOLER  |
| TM DSGN    | PT 8 WATTS 15 WATTS  |
|            | FANCE 55 INTERFERENCE 56 INTERFERENCE 57 INTERFERENCE 58 SHIELDING   |
| -          | NONE SENSITIVE   |
| EAD TIME   | 60. DATA   |
| MONTHS     | SRE ITEM 62 10 MIN/ORBIT MAX   |
| SECUPITY   | IBNTS  |
| DNC        | THE WILL REGULAR 10000 SAMPLES PER SECOND PER  |
|            | TO DECENDED AND APPEARS OF TO BINGTES PER CREET, PERSO LE RESCLUELON<br>TO DECENDED ANDROS OF DEBIT-THE DELEMBEDY HAS NOT BEEN DEPENDED  |
|            |  |
| BITING     | SCANNING, RADIATIVE  |
|            | HRIR AND MRIR EXPERIENCE:  |
| E TEM-     |  |
| OF THE     | W.R.:PROPOSAL FOR A I  |
| F ROCKS    | SURFACE COMPOSED ANALOGE OF THE STATE OF THEBOY E. ***** I LON*  |
|            | DITED OF   |
| 0.03       | ORDBERG, W. SCIENCE, V. 150, NO. 3696, 1965.   |
| SAVE-      |  |
| TY OF      | 65, HISTORICAL REMARKS   |
| SED ON     |  |
| RS THE     | 66 DIAGFAINS   |
| 15 DE-     |  |
| ED BY      |  |
| 10.2 TO    |  |
| . KE-      |  |
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| TERONS     |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBILLOG, MASSACHUSETTS   | 38. SPECTRAL RANGE   38. SPECTRAL RESOLUTION   37. TIME CONSTANT   0.4 TO 0.65 HICRON   38. FIELD OF VIEW   38. GROUND SWATH   10.0 BY 10.0 DEG 54 NH BY 54 NH PROM 450 NH ALTITUDE  |
|--|--|
| 1. TITLE   | 1ESOLUTION 41, SPATIAL RESOLUTION  |
| VIDICON CAMERA SYSTEM  | N 05h K  |
| NOT STONE  | ALTONOMORPHICATION OF THE PARTY |
| 7. ORGANIZATION 8. TELEP   |  |
| STROUD, W.G. (HGR) GODDARD SPACE FLT CENTER 301-982-4400   | 47. COMPONENTS   |
| 12. CONTRACT   13. CONTRACT NUMBER   14. FLASH INDEX NUMBER   15. START   16. CONTRACT NUMBER   15. START   15. ST | TV CAMERA, TRANSMITTER, TAPE RECORDER 48. WEIGHT AS. VOLUME FO AVERAGE POWER 18. STANDSV POWER 152. PEAK POWER 153. MTBF   |
| 21.00  | 9 HATTS  |
| 19, AGENCY   | 56. INTERFERENCE 57 INTERFERENCE   |
| GARBACZ, M.L. NASA HDOTRS   OSSA/SRO  202-963-4291 22. VENDOR   24 GARE   CACATION   CALCUMPT   CALCAD TIME   CALC | 58. CALIBRATION SENSITIVE SO. DATA RECOVERY SO. CALIBRATION SO. CALIBRATICA SO |
| FRO-ELECTRONICS PRINCETON, N   | NO IN-PLIGHT CALIBRATION DELAYED OR REALTIME DAYSIDE OF ORBIT  |
| OW-ANGLE P/1.8 0.5-INCH VIDICON  | CTURES CAN   |
| PLICATION  | TING AT  |
| MET TIROS 1  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY-TO ACQUIRE AND TRANSMIT (REALTIME OR DELAYED) PICTURES   | SHOWED DETAILS OF SPECIFIC CLOUD TYPES.  |
| ER DETAIL THAN WIDE AND MEDIUM ANGLE CAMERAS.  | 64. REFERENCES   |
|  | 1) SIGNIFICANT ACHIEVEMENTS IN SAT MET 1958-1964. NASA SP-96.***   |
|  | NAUTICS, V.5, JUNE 1960.***3) MESNER, M.H. AND STANISZEWSKI, J.:   |
| - 1  | TV CAMERAS FOR SPACE EXPLOR, ASTRONAUTICS, V.5, MAY 1960.***   |
| <u> </u>   | 4) INSTRUMENTS AND SPACECRAPT, NASA SP-3028, 1966. ***5) DATA<br>AVAILABLE FROM NATIONAL WEATHER RECORDS CTR (ESSA), ASHEYILLE, NC   |
| VIDICON TUBE AND A POCAL-PLANE SHUTTER THAT PERMITS STORAGE OF   | 65, HISTORICAL REMAHKS   |
| STILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM CONVERTS THE STOORED DICTURES INTO TRIBUTSTON-TYDE REPORTED STONAIS, WHICH   | IDENTICAL CAMERA ALSO FLOWN ON TIROS 2   |
| $\alpha$   |  |
| ICTURES  |  |
| POB TRANSMISSION AT A LATER TIME. THE CAMERA HAS A NARROW ANGLE  |  |
| THE WIDE-ANGLE CAMER   |  |
| VIEWS, THE CAMERA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND A  |  |
| VIDEO BANDWIDTH OF 62.5 KHZ. THE SUU LINE FRAME IS PROCESSED FOR STORAGE IN 2 SEC. A MINIMUM INTERVAL OF 10 SECONDS BETWEEN PIC-   |  |
| TURES IS REQUIRED FOR THE TARGET IMAGE TO BE ELECTRICALLY ERASED   |  |
| THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITES SPIN AXIS AND   |  |
| LS AUTOMATICALLY TAIGERAND SO AS TO BE IN A FICTORE LANGE OUE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMISSION OF THE ENTIRE  |  |
| REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 10 SECONDS BY A 2-<br>WAIT PM TRANSMITTER OPERATING AT A NOMINAL PREQUENCY OF 235 MHZ.  |  |
| 32. PHENOMENA OBSERVED   |  |
| CLOUD COVER OVER THE EARTH'S SURFACE   |  |
| S. MCASUREMENT HANGE   |  |
|  |  |
|  |  |

| INSTRUMENT RESUME NATIONAL ARRONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEACH CENTER CAMBRIDGE, MASSACHISFTS                | CRON NA UND SWATH  |
|---|--|
| 1. TITLE 2. ACRONYM 3. EXP NO   | 14.0 BY /4.0 DEG 650 NM BY 650 NM PROM 450 NM ALTITUDE CONNOCURAR RESOLUTIONAL, SPATIAL RESOLUTION   |
| VIDICON CAMERA SYSTEM   | 2.2 DEG 1.4 NN PER TV LINE PROM 450 NM ALTITUDE  |
| P. P. P. N. C. 11 / 11 / 16 9   | TEN CIRCUITAR  |
| R 7. ORGANIZATION 8. TELEP  | THE PROPERTY OF THE PROPERTY O |
| . (MGR) GODDARD SPACE PLT CENTER  | A MANAGEMENT AND A STATE OF THE |
| E. COLINCESTICATION   | GO B WOM THE BO  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. START 16. CONTRACT NUMBER 15. STATUS                                  | 18 WEIGHT 49 VOLUME 50 AVERAGE POWER 81. STANDBY POWER 52. PEAK POWER 53. MTBF   |
|   |  |
| 19. AGENCY  | SG. INTERFERENCE 57. INTERFERENCE  |
| GARBACZ, M.L NASA HDVTRS OSSA/SRO 202-963-4291  | 15ENSITIVE 160, DATA RECOVERY 161, FREQUENCY OF OBSERVATION  |
| ECTRONICS PRINCETON, NEW JERSEY 04/60 NA  | THE CALIBRATION DELAYED AND REALTIME   |
|   | METRY REQUIREMENTS   |
| 18 APPLICATION   28. SPACECRAFT   | FULL REEL OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING<br>DATA FOR WEATHER ANALYSIS THAN PROM MED OR NARROW ANGLE CAMERAS   |
| MET TIROS 1   |  |
|   |  |
| PRIMARY-TO ACQUIRE AND TRANSMIT PICTURES OF THE EARTH'S CLOUD<br>COVER TO PROVIDE METEOROLOGISTS WITH DETAILED INFORMATION ON     | BROAD SYNOPTIC VIEWING OF CLOUD COVER PATTRRNS, MORE VALHABLE<br>DATA POR WEATHER ANALYSIS THAN PROM MED, OR NARROW ANGLE CAMERAS  |
| IFIC A  | 64. REFERENCES   |
| TV SENSOR IN SPACE.   | 1) SIGNIFICANT ACHIEVEMENTS IN SAT NET 1958-1964, NASA SP-96.***   |
|   | Z) COLDBERG, E. M. AND LANDON, V.D.: NEI EQUIP FOR ILKUS (. MSING-<br>NAUTICS, V.S. JUNE 1960. ***31 MESNER, M.H. AND STANISZEWSKI. J.:  |
| 31. PRINCIPLES OF OPERATION   | .5, MAY 1960. **   |
| 14  |  |
| ON TIROS 1-10 AND SIMILAR CONFIGURATION ON ESSA 1. ON TIROS 1-8,  | AVAILABLE PROM NATIONAL WEATHER RECORDS CTR (ESSA), ASHEVILLE, NC. 65, HISTORICAL REMARKS  |
|   | IDENTICAL CAMERA PLOGN ON TIROS 1-10 AND SIMILAR ON ESSA 1   |
| TUBE AND A POCAL-PLANE SHUTTER THAT PERMITS STORAGE OF STILL  | GE. DIAGRAMS   |
| PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM CONVERTS THE  |  |
|   |  |
| CAN BE TRANSMILITED TO GROUND RECELVERS ON COMMAND. THE SISTEM CAN  |  |
| TRANSMISSION AT A LATER TIME. THE CAMERA HAS A WIDE ANGLE (105  |  |
| DEG) ELGEET P/1.5 LENS PRODUCING A RESOLUTION OF 1.4 TO 2.0 NM.   |  |
| THE CAMERA HAS A SHUTTER SPEED OF 1.5 MILLISEC AND A VIDRO-BAND-  |  |
|   |  |
| TRIC  |  |
| AXIS  |  |
| HATICALLY TRIGGERED SO AS TO BE IN A PICTURE TAKING HODE ONLY<br>HUMPN DIRECTED TOWARD THE PARTH, TRANSMISSION OF THE ENTIRE REEL |  |
| OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SEC BY A 2-WATT PM  |  |
| NSMITTER OPERATING AT A NOMINAL PREQUENCY OF 235 MHZ.   |  |
| CI CHE COME OF AND BUT DADED OF THE BANKS   |  |
| 33. MEASUREMENT RANGE.  |  |
| 5 LEVRLS OF GRAY  |  |
| 34. PRECISION AND ACCURACY  |  |
|   |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONAUTICS RESEARCH CENTER CARACTER SECRET RESOLUTIONS OF THE PROPERTY OF | AL RANGE 36. SPECTRAL RESOLUTION 37. TIME 2 TO 50.0 MICRONS SEE ITEM 31 FVIEW 39. GROUND SWATH   |
|---|--|
| CAMBRIDGE, MANAGACHUSE I I S  | 50.0 DEG 470 NM DIAM CIRCLE PROM 410 NM ALTITUDE   |
| RESOLUTION NONSCANNING RADIOMETER LANR  | 50.0 DEG 470 NM DIAM CIRCLE PROM 410 NM ALTITUDE   |
| (TITLE CONT.)  4. RESUME 5. VIRGON 11 / 10 / 69   0.0.0.3   | 42 POINTING ACCURACY 43, POINTING RATE 44, ALTITUDE 45, INCLINATION NRD CTRCITLAR MEDITIM DOSTGRADE  |
| ATOR 7. ORGANIZATION 8. TELEPH  |  |
| HANEL, DR. R. GODDARD SPACE FLT CENTER 301-982-4528   | A) POLIDARIANTS  |
| GODDARD SPACE PLT CENTER  | 2 THERMISTORS, REFERENCE RESISTORS, FLECTRONICS  |
| NUMBER 15. DATE 16. COMPLETION  | WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDSY POWER 52. PEAR   |
|   | 2 LB 30 WATTS  |
| SA/SRO  | SENSITIVE  |
| 23 LOCATION   | 59. CALIBRATION 60. DATA RECOVERY (81. FREQUENCY OF ORSERVATION  |
| ENGINEERING CO STAMFORD, CONN.  | BY REFERENCE RESISTORS DELAYED TELEMETRY CONTINUOUS  |
| AS INSTRUMENTITY OF ANY TAX CASHING TAX DECATION TROUBLES HAVE  | tor now , both analytic of lambs and adopt and   |
| Z-CHANNEL MON-SCANNING LON-RESOLUTION INFRANED  | ARE USED FOR   |
| MRT TIROS 2   |  |
| 30- PURPOSE   | 63. ADVANTAGES AND LIMITATIONS   |
| ECTED SOLAR   | 1  |
| PROM THE EARTH, TO PERMIT THE DETERMINATION OF THE APPARENT   | DETECTOR COATING AND CONF OPTICS INADEQUATE IN SPECTRAL RESPONSE   |
|   | 11 TR AND REPLECTED SOLAR RADIATION MERSCHREMENTS FROM TIRDS 2 MPT   |
| 11  |  |
| 11 DOLINCTOL CO OF CREATION   | APPROACHES TO REMOTE ATMOSPHERIC PROBING IN THE IR FROM SATS.  |
| THE TOUR DECOTTOR NON-CLANNING DANTOMPHED GAG DITCH IN AN   | NACA II A -0.100, BAI 1000-++-1 DANING F-, EL-AL-: ILIUS LUN<br>DDC-01H-TOW DANITOM DIED NACA TO N (1.11 CDD- C. *********************************** |
| AND   | N.C.   |
| THERMISTOR BOLOMETER DETEC  |  |
| P WHIC  | IDENTICAL RADIOMETERS PLOWN ON TIROS 2, 3, AND 4   |
| OF A HIGHLY REPLECTIVE CONE. THE BLACK DETECTOR IS EQUALLY SEN-   | 65. DIAGRAMS   |
| SITIVE TO REFLECTED SUNLIGHT AND TO LONG WAVE TERRESTRIAL RADIA-  |  |
| PINCHIVE IN THE VISIBLE AND REAR INFRARED. THIS IT MEASURES   |  |
| ONLY LONG WAVELENGTH THERBAL RADIATION (5 TO 50 MICRONS). THESE   |  |
| DETECTORS PRESENT THE INSTRUMENTATION PACKAGE WITH RESISTANCES  |  |
|   |  |
| BALANCE OF AN AREA CAN BE COMPUTED: THE FIELD WHEN VIEWING DI-  |  |
| THIS AND LOA CLACLE   |  |
|   |  |
| H   |  |
| NAL IS USED TO MODULATE SEPARATE AUDIO-PREQUENCY OSCILLATORS.   |  |
| THIS MODDLATED OUTPUT IS PROCESSED THROUGH THE TIME-SHARING   |  |
| 1   |  |
| 32, PHENOMENA OBSERVED  |  |
| THERMAL AND REFLECTED SOLAR RADIATION FROM EARTH  |  |
| -100 npc c an ACO npc c   |  |
|   |  |
| S/N BETTER THAN 30 DB   |  |
|   |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER                                      |   |
|--|---|
| CAMBRIDGE, MASSACHUSETTS  1. TITLE   | 5.0 DEG 35 NR DIAR CIRCLE PRON 410 NN ALTITUDE  |
|  | 5.0 DEG 95 NA AT CENTER PROM 410 NM ALTITUDE.   |
| 11/10/69   | MED CIRCULAR  |
| 7. ORGANIZĄTION  | 46, SPECIAL REQUIREMENTS  |
| NORDBERG, DR. W. GODDARD SPACE PLT CENTER 301-982-500.3  9. CO-INVESTIGATOR 10. ORGANIZATION                                     | 47. COMPONENTS  |
| 13 CONTRACT 113 CONTRACT MIMBER 14 F. ACH INDEX MIMBER 15 START 14 CONTRACT MIMBER   | RADIONETER (5 THERMISTOR BOLOMETER DETECTORS) - ELECTRONICS   |
| 3.FG   | A WATES   |
| GABBACZ M.L. NASA HDOTRS OSSA/SRO 202-963-4291   | 54. INTERPERENCE 55. INTERPERENCE 58. INTERPERENCE 57. INTERPERENCE 198. SHIELDING                                    |
| 23. LOCATION   | 80. DATA RECOVERY   |
| BARNES ENGINERALING CO STANFORD, CONN. 11/50 NA 12.  | SPACE LOOK FOR TEROING DELAYED TELEMETRY CONTINUOUS 62. TELEMETRY REQUIREMENTS  |
| 5-CHAN THERMISTOR-BOLOMETER RED-RES SCANNING IR  | 7 PREQUENCY BANDS ARE USED FOR TOTAL IR PACKAGE (LOW + MED IR);   |
| MET TIROS 2  |   |
| PRIMARY-TO REASURE EMITTED THERMAL AND REPLECTED SOLAR RADIATION   | AN UNCERTAINTY EXISTS IN THE ABSOLUTE VALUES OF THE MEASUREMENTS  |
| PROM THE BARTH AND ITS ATHOSPHERE IN 5 SPECTRAL REGIONS. PARAM-  |   |
| RIEKS TO BE STUDIED ARE: ATROSPHERIC WATER VAPOR ABSORPTION REND DAY-NIGHT TIME CIOID COURS BIRDD AND THERMAI BADIATION          | 1) RANDEPN G R PT. AI . INPRESED AND REFERENCED COLLAR RANDEN   |
| TO GENERATE RADIATION MAPS FOR RESEARCH IN ATMOSPHERIC PROPER-   | IROS  |
| T. KS. 31. PRINCIPLES OF OPERATION   | 2) DATA CATALOG OF SAT AND ROCKET EXPTS. NASA/GSPC-NATIONAL SPACE SCIENCE DATA CIR. REPT. NSSDC 68-01. JAN. 68. ***3) |
| NIMBUS 2 CONTAINED 5 CHANNEL SCANNING R  | BERG, I. HET IR INSTRUMENTS FOR SAT. NASA/GSFC, 1   |
| BTERS USING FILTERS AND BOLOMETER DETECTORS. THE NIMBUS 2 RADI-  | DATA AVAILABLE FROM NATIONAL SPACE SCIENCE DATA CTR. NASA/GSFC.   |
| ON THE TIROS SERIES PRECISE BANDAIDTHS VARIED FOR EACH FLIGHT,   | SIMILAR RADIOMETERS FLOWN ON TIROS 2, 3, 4,7 AND NIMBUS 2 (MRIR)  |
| FOR TIROS 2 THRY WERE 5.72-7.0; 7.2-22.2; 0.26-7.6; 7.2-32.6;  | ec. D.AGRAMS  |
| THE DETECTORS ALTERNATELY LOOK INTO SPACE AT A 45 DEGREE ANGLE.  |   |
| BACH CHANNEL HAS THE SAME PRINCIPLE OF OPERATION: THE ALTERNAT-  |   |
| AL TO THE DIPERRUCE IN RADIATION ENERGY COMING FROM 2 OPPOSITE   |   |
|  |   |
| UPON A CHOPPER DISK THAT HAS ALTERNATE BLACK AND MIRRORED<br>HALVES, ALL 5 DISKS ROTATE SINULTANEOUSLY AT 46 RPS, AND HAVE       |   |
| _  |   |
| SATELLIE SPIR 15 USED TO PROVIDE THE SCAN LINE, WHICH IS INFO<br>ADVANCED BY OPRITAL MOTION OF THE SATELLITE. THE INSTRUMENT HAS |   |
| A 5 DEG FOY FOR BACH CHANNEL, DATA ARE RECORDED ON THE SATEL-  |   |
| €  |   |
| 32. PHENOMENA OBSERVED   |   |
| RADIATION PROM EARTH AND ATMOSPHERE IN 5 SPECTRAL REGIONS 33. MEASUREMENT RANGE  |   |
| 34. PRECISION AND ACCURACY   |   |
| A S/H RATIO OF BETTER THAN 30 DB; ABSOLUTE ACCURACY OF +-7 DEG K   |   |

| INSTRUMENT RESUME  | AANGE  |
|--|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICE RESEARCH CENTER  | 5 TO 0.65 MICRON   F VIEW   38. GROUND SWATH   |
| CAMBRIDGE, MASSACHUSETTS   | 10.0 BY 10.0 DEG 54 NM BY 54 LM PROM 410 NM ALTITUDE   |
| CON CAMERA SYSTEM  | 0.02 DEG 850 PRET DER TV-LINE PROM 410 NM ALTITUDE   |
|  | JAACY 43. POINTING RATE 44. ALTITUDE   |
| S  | MED CIRCULAR MEDIUM POSIGRADE  |
| VESTIGATOR 7. ORGANIZATION   | 46. SPECIAL REQUIREMENTS   |
| STAMPFIL, R. A. (MGR) GUDDARD SPACE FLT CENTER JU1-982-6163  | 47. COMPONENTS   |
|  | CAMERA, TRANSMITTER, TAPE RECORI   |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 16. START 18. CONTRACT NUMBER 16. START 18. CONTRACT NUMBER 18. CONTRACT NUMBER 18. START 18. CONTRACT NUMBER  | ву Ромея 52. 'РЕ   |
| THOSE STORY  | 7 LB! 9 WATTS NONE 9 WATTS!  |
| OOTES  | 34. INTERFERENCE 33. INTERFERENCE 34. INTERFERENCE 35. SHIELDING SPNSTTOTY VP  |
| 23 LOCATION  | 60. DATA RECOVERY  |
| RCA ASTRO-ELECTRONICS PRINCETON, NEW JERSEY 11/60 NA   | AS THE PARTIES REQUIREMENTS  |
| DY-ANGLE P/1.8 0.5-INCH VIDICON  | TURES CAN BE READ OUT IN APPROX 100  |
| 28. APPLICATION  | USING AN FM TRANSMITTER OPERATING AT PREQUENCY OF 235 MHZ.   |
| IP OSE   | 63. ADVANTAGES AND LIMITATIONS   |
| -TO ACQUIRE AND TRANSMIT (REALTIME OR DELAYED)   | SHOWED DETAILS OF SPECIFIC CLOUD TYPES.  |
| THE BARTH'S CLOUD COVER SHOWING SPECIFIC CLOUD TYPES IN GREATER  | 64. ARFERENCES   |
| DEINTE IDAN MIDE AND DECION ANGED CAREANS.   | 4** TO TO TO A DATE TO A DATE AND THE TOTAL TO A DATE OF THE A DATE OF THE A DATE OF THE A DATE OF THE OFFICE OF T |
|  | 2) GOLDBERG, E.A. AND LANDON, V.D.: KEY EQUIP POR TIROS 1. ASTRO-  |
| TO A MAINTAIN OF THE PARTY OF T | NAUTICS, V.5, JUNE 1960.***3) MESNER, M.H. AND STANISZEWSKI, J.:   |
| THOTWA   | IV CAMERAS FOR SPACE EXPLOR. ASTRONAUTICS, V.S. MAY 1960, ***  |
| THIS NAKHOW ANGLE VIDICON CAMERA IS IDENTICAL TO THE ONE THAT WAS PLOWN ON THE PIRST TIROS. IT CONSISTS OF A 1/2-INCH VIDICON  | 4) INSTRUMENTS AND SPACECRAFT. NASA SP-30.28, 1966. ***) DATA<br>AVAILABLE PROM NATIONAL WEATHER RECORDS CTR (RSSA) ASHRVILLE NG   |
| TUBE AND A FOCAL-PLANE SHUTTER THAT PERMITS STORAGE OF STILL   | 65. HISTORICAL REMARKS   |
| PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM CONVERTS THE   | IDENTICAL INSTRUMENT PLOWN ON TIROS 1.   |
| STORED PICTURES INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH   | 66. DIAGRAMS   |
| CAN BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM CAN  |  |
| TRANSMISSION AT A LATER TIME. THE CAMERA HAS A NARROW ANGLE (12  |  |
| GOR F/1.5 LENS PRODUCING A RESOLUTION OF ABOUT   |  |
| O  |  |
| THE CARERA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND A VIDEO-  |  |
| BANDWILLIN OF 62.3 KHZ. THE 300 LINE FRANK IS PROCESSED FOR SICK-AGE IN 2 SECS. A MINIMUM INTERVAL OF 10 SECONDS BETWEEN PICTURES  |  |
| IS REQUIRED FOR THE TARGET IMAGE TO BE ELECTRICALLY ERASED. THE  |  |
| œ.   |  |
| SE THE ENTIRE  |  |
| BE ACCORPISHED IN 100<br>PERATING AT A NOMINAL F   |  |
|  |  |
|  |  |
| CLOUD COVER OVER THE EARTH'S SURFACE 33. WEASUREMENT RANGE   |  |
| 7 TO 8 LEVELS OF GRAY  |  |
| 34. PRECISION AND ACCURACY   |  |
|  |  |

| MATIONAL ACCOUNTING AND CALOT ACCOUNTED AND CALOT   | 35. SPECTRAL RANGE 35. SPECTRAL RESOLUTION 37. TIME CONSTANT   |
|---|--|
| NATIONAL AERONAUTICS AND SYACE ADMINISTRATION ECTROPOLICE RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | State of the state |
| 1. TITLE 2. ACRONYM 3. EXP NO   | 40. ANGULAR RESOLUTIONAL, SPATIAL RESOLUTION   |
| VIDICON CARERA SYSTEM (TITLE CONT.)   | 42 POINTING ACCUPACY AS POINTING BATE 44 ALTITUDE AS INCLUDED  |
| LE LENS 11/10/69  | MED CIRCULAR   |
| GR) GODDARD SPACE PLT CENTER  | 49. J' C'MADANENTS   |
| 10.450  | TRANSMITTER, TAPE RECORDER   |
| 12. THE IS CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 18. OATE DOST PITCHE   | 148. WEIGHT 148. VOLUME 50. AVERAGE POWER 51. STANDORY FOWER 52. PEAK POWER 53. MTBF   |
| 19. AGENCY 20.PGM OFFICE 21. TELEPHO  | HE DE SE INTERFERENCE SE INTERFERENCE 57 INTERFERENCE SE SHIELDING   |
| GARBACZ, M.L. INASA HDOTRS OSSA/SRO 202-963-4291  | SENSITIVE 60. DATA   |
| TRO-ELECTRONICS PRINCETON, NE   | DELAYED AND REALTIME   |
| S-INCH KIDE-ANGLE P/1, 5 LOW-RESOLUTION VIDICON   | FULL REEL OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING  |
| NO.   | ERATING AT FREQUENCY OF 235  |
|   |  |
| PRIMARY-TO ACCUIRE AND TRANSMIT PICTURES OF THE EARTH'S CLOUD COVER-TO PROVIDED INFORMATION ON THE PRIMARY THE TABLE OF THE PROVIDED TO THE TABLE OF THE PROVIDED THE PROPERTY AND ACCOUNTS OF THE PROPERTY AND ACCOUNTS OF T | BROAD SYNOPTIC VIEWING OF CLOUD COVER PATTERNS. MORE VALUABLE PARTE FOR WEATHER ANALYSIS THAN FROM MED OR NARROW ANGLE CAMERAS.  |
| C   | CANT ACHIEVEMENTS IN   |
|   | 2) GOLDBERG, E.A. AND LANDON, V.D.: KEY EQUIP FOR TIROS 1. ASTRO-  |
| 31. PHINCIPLES OF OPERATION   | NAUTICS, V.S. JUNE 1960.***3) RESNER, N.H. AND STANISZEMSKI, J.:<br>IV CAMERAS POR SPACE EXPLOR. ASTRONAUTICS. V.S. MAY 1960.***   |
| 12,   | AND SPACECRAFT. NASA SP-3028, 1966.  |
| A STELLAR CONFIGURATION HAS PLOWN ON ESSA 1. ON TIROS 1 THRU B ST<br>10 TRE CAMERAS WERE ALIGNED PARALLEL TO THE S/C SPIN AXIS AND  | AVAILABLE FROM NATIONAL MEATHER RECORDS CTR (ESSA), ASHEVILLE, NC.   |
| EXTENDED THROUGH THE BASE PLATS, IT CONSISTS OF A 1/2-IN VIDICON  | IDENTICAL CAMERA PLOWN ON TIROS 1-10; SIMILAR CAMERA ON RSSA 1.  |
| TUBETHING A FOCAL-FLANK SHUTTER THAT PERRITS STORAGE OF STILL.  | So. LIACHAMD   |
| STORED PICTURES INTO TELEVISION-TYPE RIECTRONIC SIGNALS, WHICH  |  |
| CAN BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND, THE SYSTEM CAN   |  |
| ALSO PROCESS AND STURK UP TO 32 PICTURES ON MAGNETIC TARE FOR<br>TRANSMISSION AT A LATER TIME, THE CAMERA HAS A WIDE ANGLE(105  |  |
| 0   |  |
| THE CARERA HAS A SHUTTER SPRED OF 1.5 MILLISEC AND A VIDEO-BAND-<br>WIDTH OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED FOR STORAGE  |  |
| IN 2 SEC. A MINIMUM INTERVAL OF 10 SEC BETWEEN PICTURES IS RE-  |  |
| QUINED FOR THE TANGET LEAGE TO BE ELECTRICALLY ERASED.THE CAMERA<br>IS ALIGNED PARALLEL TO THE SPIN AXIS OF THE SATRILITE. AND IS   |  |
| COMMAND. TRANSMISSION OF  |  |
| PICTURES CAN BE ACCOMPLISHED IN 100 SECONDS BY A 2-WATT FM<br>TRANSHITTER OPERATING AT A NOMINAL PREQUENCY OF 235 MHZ.  |  |
| 22. PHENOMENA OBSERVED  |  |
| CLOUD COVER AND THE EARTH'S SUBPACE   |  |
| The contract of the same  |  |
| A PRECISION AND ACCURACY  |  |
|   |  |
|   |  |

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| IN 51 K U M EN I K ES U M E  NATIONAL AERONAUTISA NO 5 PAGE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | 36 SPECTRAL PANGE 36 NICRONS SET ITEM 31  38 FIELD OF VIEW 39, GHOUND SWATH  50,0 DEG UZN NN NITAM CTROLE PROM U75 NN AITTHINP  |
|--|---|
| 1. TITLE 2. ACRONYM 3. EXPINO  | RESOLUTION SPATTAL RESOLUTION   |
| LOH-RESOLUTION NONSCANNING RADIOMETER LENR (1 PASSEME S. VINGOL) (2) PASSEME (1) PASSEME (1) PASSEME (2) PASSEME (3) PASSEME (3) PASSEME (3) PASSEME (4) PASSEME (4) PASSEME (4) PASSEME (4) PASSEME (5) PASSEME ( | 50.0 DEG. 470 NR PROM 475 NM ALTITUDE TO INCLINATION  |
|  | MED CIRCULAR MEDIUM POSIGRADE   |
| ATOR 7. ORGANIZATION   | 46. SPECIAL REQUIREMENTS  |
| HANEL, DR. R. GODDARD SPACE PLT CENTER 301-982-4528  | 47 COMPANIENTS  |
| GODDARD SPACE PLT CENTER   | 2 THERMISTORS, REPERENCE RESISTORS, BLECTRONICS   |
| 15. START 16. COMPLETION   | WEIGHT '49. VOLUME 50. AVERAGE POWER 51. STANDOY POWER 152.   |
|  | 2 LB: SACCION SINGLES WATTS   |
| 18. MONITOR 18. AGENCY 20.PGM OFFICE 21. TELEPHONE   | 54 INTERFRENCE 55 INTERFRENCE 56 INTERFRENCE 57 INTERFRENCE 58 SHIELDING  |
| 23 LOCATION  | 59. CALIBRATION 60. DATA RECOVERY 61.FREQUENCY OF OSSERVATION   |
| EERING CO STAHFORD, CONN.  | TORS   DELAYED TELEMETRY  |
| DADIOUSEN TITE   | TON TON TOWN TO DAY TO DAY OF THE   |
| 29. SPACECRAFT   | ដ្  |
| HET TIROS 3  |   |
| - 1  |   |
| PRIMARY-TO BEASURE THE THERMAL AND REFLECTED SOLAR RADIATION FROM THE BARTH. THE DETERMINATION OF THE APPARENT BY ACCRONY TRADED AND AND AND AND AND AND AND AND AND AN  | STRONG THERMAL COUPLING BETWEEN DETECTOR AND SATFLLITE. WHITE DETECTOR AND SATFLLITE. WHITE PERFECTED COALING AND CONE OPTICS INADEQUATE IN SPECTRAL RESPONSE. 18: REFERENCES |
|  | 1) IR AND REPLECTED SOLAR BADIATION MEASUREMENTS PROM TIROS 2 MET SAT. NASA IN D-1096, NOV. 1961. ***2) BANDEEN, W.R.: EXPERIMENTAL   |
| 31. PRINCIPLES OF OPERATION  | APPROACHES TO REMOTE ATMOSPHERIC PROBING IN THE IR FROM SAITS.  |
| THIS LOW-RESOLUTION NON-SCANNING RADIOMETER WAS PLOWN IN AN  | *** 4 DATA  |
| IDENTICAL CONFIGURATION ON TIROS 2, 3, AND 4. IT CONSISTS OF 2   | ABLE FROM WORLD DATA CENTER, ASHEVILLE, N.C.  |
| DETECTORS, ONE OF THESE IS A BLACK THERMISTOR BOLORETER DETECTOR   | 6   |
| OF A HIGHLY REPLECTIVE CONE. THE BLACK DETECTOR IS EQUALLY SEN-  | SE DIAGRAMS   |
| SITIVE TO REFLECTED SUNLIGHT AND TO LONG WAVE TERRESTRIAL RADIA-   |   |
| TION(0.2 TO SO MICRONS). THE WHITE DETECTOR IS COATED TO BE HE-  |   |
|  |   |
| TECTORS PRESENT THE INSTRUMENTATION PACKAGE WITH RESISTANCES   |   |
| WHICH VARY WITH RADIATION. PROH THE DETECTED VALUES THE HEAT RALLANCE OF AN ARPA CAN BE COMPUTED. THE PIETD GHEN VIRGING DI-   |   |
| AXI  |   |
| W OBSERVES !   |   |
| GLE TELEVISION CAMER   |   |
| THE COLFUI OF EACH DETECTOR IS ARRELFTED, AND THE RESULTING SIGNAL IS USED TO MODULATE SEPARATE AUDIO-PRECUENCY OSCILLATORS.   |   |
| GH THE TIM   |   |
| SWITCHING CIRCUIT WITH THE OUTPUT OF THE SCANNING RADIORKIER.  |   |
| 32. PHENOMENA OBSERVED   |   |
| THERMAL AND REFLECTED SOLAR RADIATION FROM THE EARTH   |   |
| -100 DWG C #0 460 DWG C  |   |
|  |   |
| S/N BETTER THAN 30 DB  |   |

| 92.TELEMETAY REQUIREMENTS 7. FREQUENCY BANDS ARE USED FOR TOTAL IR PACKAGE (LOW + MED IR), THE 7 CHANNELS HAVE A TOTAL WIDIH OF 310 HZ. | G. ADVANTAGES AND LIMITATIONS  STRONG THERNAL COUPLING BETWEEN DETECTOR AND SATELLITE. WHITE DETECTOR COATING AND CONE OPTICS INADEQUATE IN SPECTRAL RESPONSE.  1) IR AND REPLECTED SOLAR RADIATION MEASUREMENTS FROM TIRGS 2 MET SAT. NASA TN D-1096, NOV. 1961.***2) BANDEEN, W.R.: EXPERIMENTAL APPROACHES TO REMOTE ATMOSPHERIC PROBING IN THE IR FROM SATS. NASA TM X-63188, MAY 1968.***3) BARTKO, F., ET.AL.: TIROS LOW RESOLUTION RADIOMETER. NASA TN D-614, SEPT. 64.***4) DATA AVAIL- ABLE FROM WORLD DATA CENTER. ASHEVILLE, N.C. | MENT PLOHN ON TIEOS 2 . 3 |  |
|---|--|---------------------------|--|

| INSTRUMENT RESUME  | 36. SPECTRAL RESOLUTION 37. TIME CON  |
|--|---|
|  | 0.3 TO 60.0 MICRON NA 5. SECONDS  |
| CAMBRIDGE, MASSACHUSETTS   | 180.0 DEG 500 NM RADIUS CIRCLE PROM 475 NM ALTITUDE   |
|  | GULAR RESOLUTION  |
| LON-RESOLUTION ORNIDIRECTIONAL RADIOMETER LAGSUME 15. VERSON   | NA NA NA NOINTING RATE 44. ALTITUDE 145. INCLINATION  |
| 11/10/69   | MED CIRCULAR ME   |
| 7. ORGANIZATION  | 46. SPECIAL REQUIREMENTS  |
| SUCHT, DR. V.E. UNIVERSITY OF MISCONSIN 608-262-5938 9, CO-INVESTIGATOR 10, ORGANIZATION 11. TELEPHONE   | 47. COMPONENTS  |
| RABENT, DR. R. J. UNIVERSITY OF RISCONSIN 608-262-5938   | 2 DETECTION DEVICES, BLECTRONICS 18 WHIGHT IS VOLUME 50 AVERAGE POWER   15 MATER 18 WHIGHT IS VOLUME  |
| ď  | TATT EVE  |
| TO AGENCY SOLVEN OF THE COLUMN CASE OF THE CASE O | 34. INTERFRENCE 35. INTERFRENCE 196. INTERFRENCE 35. INTERFRENCE 30.  |
| GARBACK B.L. INASA HUUTKS IUSSA/SKUI ZU -96 3-4291 22. VENDOR 22. VENDOR 22. JENE 23. LEAD TIME  | 199. CALIBRATION 60. DATA RECOVERY OF FREQUENCY OF OBSERVATION  |
| DRIVERSITY OF MISCONSIN MADISON, MISCONSIN 07/61 NA  | AS TELEMETRY REQUIREMENTS   |
| ER ONNIDIRECTIONAL NON-SCANNING LOW-RESOLUTION   | OTHER IR EXPIS ON-BOARD ARE RECORDED  |
|  | THE GROUND STATIONS.  |
|  | 63. ADVANTAGES AND LIMITATIONS  |
| PRIMARY- TO MEASURE THE GROSS HEAT BUDGET OF THE EARTH.***<br>SECONDARY-TO DETERMINE HOW MICH SOLAR ENERGY IS ABSORPED. RE-  |   |
| PLECTED, AND EMITTED BY THE BARTH AND ITS ATMOSPHERR AT THE  | 64. REFERENCES  |
| IT: THUS TO STUDY THE PRIME  | FROM A SATELLITE,   |
| CIRCUPALION OF IND AIMOSPHERE.   | THE EARTH'S RADIATION BUDGET, PHD THESTS, U. OF MISC. 1968.***  |
| 31. PRINCIPLES OF OPERATION  |   |
| THIS EXPERIMENT WAS PLOWN IN AN IDENTICAL CONFIGURATION ON TIROS   | CENT  |
| 3, 4, AND 7, AND WAS ALSO SIMILAR TO ONE ON EXPLORER 7. TWO WIDE   | NASAZGSPC.  |
| TANGER (100 DEG FOY) LOW-TESCHILON IN DELECTION DEVICES, CACH  | Then Then I Install Production on Track 2 to and 7. STATIAR ON PYP 7  |
| UPPORTS WHI  | 16. DIAGRAMS  |
| PROJECT PROM THE SIDE OF THE SPACECRAPT, THE MIRRORS SHIELD EACH   |   |
| SENSOR PROM DIRECT RADIATION EMITTED BY THE SATELLITE'S BODY.  |   |
| BOTH BOLONGIERS HAVE A HIGH ABSORPTIVITY TO THE IR RADIATION   |   |
| INE ERKIN. INE BERC'N BOLONEIEN ALSO NAS<br>BOLAR RADIATION. THUS REPLECTED AND EMITT  |   |
| SEPARATED. THERMISTORS, FASTENED INSIDE OF THE HEMISPHERIC   |   |
| SHELLS, MEASURE SENSOR TEMPERATORES, MATCHED PAIRS OF THERMIS-   |   |
| SIDES OF THE SPACECRAFT; THEREFORE, THE MEASURED SENSOR TEMPERA-   |   |
| TURE RECEIVED FROM THE SATELLITE IS AN AVERAGE OF TWO TEMPERA-   |   |
| TORKS FROM MATCHED THERMISTORS AND SIMULATES THE RESPONSE OF AN  |   |
| ES OF THE MIRRORS A  |   |
| RESISTANCE VALUE WHICH ALLOWS ONE TO COMPENSATE FOR DRIFT OF THE   |   |
| RIECTRONICS IN THE SATELLITE.  |   |
| RADIANT ENERGY REFLECTED AND EMMITTED BY THE EARTH.  |   |
| 128 DEG K TO 188 DEC K   |   |
| 34, PRECISION AND ACCURACY   |   |
| 0.1 KELVIN DEGREE  | The second control of |
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| INSTRUMENT RESUME   | 38. SPECTRAL RANGE 36. SPECTRAL RESOLUTION 39. TIME CONSTANT 0 2 4 MICSONS CED THEM 31   |
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| NATIONAL AERONAUTIGS AND SHOED EADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 38 FIELDOFVIEW 39. GROUNDSWARD STATE TO |
| 1, TITLE  | RESOLUTION 41. SPATIAL RESOLUTION  |
| ABDIUM-RESOLUTION RADIOMETER  | 5.0 DEG 40 NM AT CENTER FROM 475 NM ALTITUDE   |
| 11/10/69  | MED CIRCULAR   |
| TOR 7. ORGANIZATION 8. TELEPHONE  |  |
| S CONVESTIGATOR SPACE PLT CENTER 301-982-5003   | 43 CANDOLICENTO  |
|   | DEDICARDER / THERESTATOR ROLLOKETER DEFECTORS - PLETTERONICS   |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. GATE. 16. CONTRACT NUMBER 15. GATE. | Y POWER 52.  |
|   |  |
| CADDARY M T NASA HOOTES OSSA CER 21. TELEPHONE  | 54. MITHERERUCE 55. INTERPERENCE 36. INTERPERENCE 57. INTERPERENCE 58. SHIELDING CONICTATIO  |
| 73 LOCATION   | 150. CALIBAATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION  |
| BARNES ENGINEERING CO STAMPORD, CONN. 11/60 NA  | SPACE LOOK FOR ZEROING DELAYED TELEMETRY CONTINUOUS  |
| RATIOMETER, 5-CHANNEL THERMISTOR-ROLOMETER MED-RES SCANNING HINC  | 7 PREDIENCY BANDS ARE ISED FOR TOTAL TR DACKAGE (LOW + MED TRI-  |
| 29. SPACECRAFT  | WIDTH OF 310 HZ.   |
| MET TIROS 3   | 63 ADVANTACES AND IMITATIONS   |
| DRIMARY-TO MERCHER EMITTED THERMAIL AND REPLECTED SOLAR RADIATION   | SENSE STORME AND ADDRESS OF THE SESSION OF THE SESSION OF THE PROPERTY OF THE SESSION OF THE SES |
|   | F NO INPLIGHT CALIBRATION.   |
| ETERS TO BE STUDIED ARE: ATMOSPHERIC WATER VAPOR ABSORPTION   |  |
| BAND, DAY-NIGHT TIME CLOUD COVER, ALBEDO, AND THERMAL RADIATION.<br>TO GENERATE RADIATION MAPS FOR RESEARCH IN ATMOSPHERIC PROPER-  | 1) TINOS 4 MADIATION DATA CATALOG AND USER'S MANUAL GSFC, DEC 63.<br>+**2) DATA CATALOG OF SATELLITE AND ROCKET EXPTS.NSSDC 68-01.JAN  |
| PS.   | 68.NASA/GSFC NATIONAL SPACE SCIENCE DATA CTR. ***3) GOLDBERG, I.:  |
|   | DROLOGICAL INPRARED INSTRUMENTS FOR SATELLITES.  |
| TIROS 2,3,4,7, AND NIMBUS 2 CONTAINED S-CHANNEL SCANNING RADIOM-  | AUG. 1968. ***4) DATA AVAILABLE PROM NATIONAL SPACE SCIENCE  |
| NSTRUMENT DES   | 1 ~ 1  |
| ON THE TIROS SERIES PRECISE BANDWIDTHS VARIED FOR EACH FLIGHT,  | SIMILAR RADIOMETERS PLOWN ON TIROS 2,3,4,7 AND NIMBUS 2 (MRIR)   |
| FOR TIROS 3 THEY WERE: 5.7-7.0; 7.07-25.0; 0.25-6.82; 7.4-32.6;   | 66. DIAGRAMS   |
| AND 0.4/3-Z.YOU BICKONS. A REFERENCE LEVEL WAS OBTAINED BY HAVING THE DETRICTORS ATTERNATELY LOOK INTO SPACE AT A LS DEGREE   |  |
| TPLE OF OPERATION:  |  |
| ALTERNATING VOLTAGE GENERATED AT THE THERMISTOR BOLOMETER IS  |  |
| PROPORTIONAL TO THE DIFFERENCE IN RADIALION ENERGI CORING FROM  |  |
| INPINGENT UPON A CHOPPER DISK THAT HAS ALTERNATE BLACK AND  |  |
| SKS ROTATE SIN  |  |
| AND HAVE IDENTICAL OUTPUT CIRCUITRY TO PREABELIFIERS AND TAPE<br>RECORDERS. SATELLITE SPIN IS USED TO PROVIDE THE SCAN LINE.  |  |
|   |  |
| INSTRUMENT HAS A 5 DEG FOV FOR EACH CHANNEL. DATA ARE RECORDED ON THE SATELITYES PUBLISS LOOP OF MACHETIC TADE FOR A DEPICE OF  |  |
|   |  |
| 32. PHENOMENA OBSERVED  |  |
| RADIATION PROM BARTH AND ATMOSPHERE IN 5 SPECTRAL REGIONS 33. MEASUREMENT RANGE   |  |
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| 34, PRECISION AND ACCURACY  |  |
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| REAL ORGANIZATION  RATELEPHONE  RATIORANIZATION  RATELEPHONE  RAGENCY  ROGANIZATION  REAGENCY  ROGANIZATION  REAGENCY  ROGANIZATION  REAGENCY  ROGANIZATION  REAGENCY  ROGANIZATION  REAGENCY  REAGENCY  REAGENCY  RESOLUTION  REPROSEDENCY  RESOLUTION  REPROSEDENCY  RESOLUTION  REPROSEDENCY  REPROSE | GRAIN GODDARD SPACE PLT CENTER 301-992-5347  GODDARD SPACE PLT CENTER 301-992-5347  IN GOD SPACE PLT CENTER 301-902 PLTGHT  IN GOD SPACE PLT CENTER 301-902 PLTGHT SPACE | 42. POINTING ACCURACY 43. POINT   |
| RE AND TRANSATION  ONLICE  REPORTED TO TELEPHONE  TO STATUS  IN A SA HOUTES  NASA HAS A SHUTTER SPEED OF 1.5 HILLISE  RANSHISSION AT A LATER TIME THAN EARNE IS PROGE  GE IN 2 SEC. A HINHUM INTERVAL OF 10 SEC BE-  RE CAMERA IS ALIGNED PARALLEL TO THE SATELIFF'S  ANTOMATICALLY TRIGGERED SO AS TO BE IN A PIC-  NOW WHEN DIRECTED TOWNED THE BARTH. TREAD  ATT WHE NASH SHALLEL TO THE SATELIFF'S  NATH WAN INTERVED TOWNEND THE BARTH. TREAD  ATT WHE NASH SHALLEL TO THE SATELIFF'S  NATH WHEN DIRECTED TOWNEND THE BARTH. TREAD  ATT PHE EARTH. TRANSHISHED IN  ATT PHE EARTH. SHANNITER OPERATING AT NOMINAL FRE-   | TO STANKATON OF THE CENTER STATE AND |                                   |
| THACT NUMBER  10. AGENCY  10. AND TRANSHIT PICTURES OF THE EARTH'S CLOUD  VIDE HETEOROLOGISTS WITH DETAILED INFORMATION ON  10. AND TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST  SPACE.  10. AND SIMILAR CONFIGURATION ON ESSA 1, HOWEVER ON  SUBCYSEEM HAS FLOWN IN AN IDENTICAL CONFIGURATION  O AND SIMILAR CONFIGURATION ON ESSA 1, HOWEVER ON  SUBCYSEEM HAS FLOWN IN AN IDENTICAL CONFIGURATION  O AND SIMILAR CONFIGURATION ON ESSA 1, HOWEVER ON  SUBCYSEEM HAS FLOWN IN AN IDENTICAL CONFIGURATION  O AND SIMILAR CONFIGURATION ON ESSA 1, HOWEVER ON  SUBCONT THE AND A FOCAL-PLANE SHUTTER THAT PERHITS  VIDICON TUBE AND A FOCAL-PLANE SHUTTER THAT PERHITS  VIDICON TUBE AND A FOCAL-PLANE SHUTTER THAT PERHITS  STORED PICTURES INTO TELEVISION-TYPE ELECTRON BEAM  STORED PICTURES INTO TELEVISION-TYPE ELECTRON BEAM  STORED PICTURES INTO TELEVISION-TYPE ELECTRON BEAM  STORED PICTURES ON THE THREE THE THE THE SHOWN  OS DEG) ELGET FT.5 LENS PRODUCING A RESOLUTION OF  R. THE CAMERA HAS A SHUTTER SPEED OF 1.5 HILLISEC  OS DEG) ELGET FT.5 THE 500 LINE PRAME IS PRO-  THE CAMERA IS ALIGNED PARALLEL TO THE SATELIFF'S  DIS AUTOMATICALLY TRICGERED SO AS TO BE ELECTRICALLY  2-WATT PR TRANSMITTER OPERATING AT NOMINAL PRE-  RANDAL AND THE RARTH'S AND SHOWN  2. MALA.  2. MALA.  3. MALA.  4. MALA.  4. MALA.  4. MALA.  4. MALA.  5. MALA.  6. MALA.  6 | STACT NUMBER  1. A AGENCY  1. A | 47. COMPONENTS                    |
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| TIRDS 3  -TO ACQUIRE AND TRANSHIT PICTURES OF THE BARTH'S CLOUD OPROVIDE RETEOROLOGISTS WITH DETAILED INFORMATION ON HELE CLOUD TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST OR IN SPACE.  LESOF OPERATION HERA SUB-SYSTEM HAS FLOWN IN AN IDENTICAL CONFIGURATION LIGHT (TIROS 3) 2 WIDE ANGLE CAMERAS WERE USED, IT CONSISTS 2 IN VIDICON TUBE AND THE TUBE SHUTTER THAT PERMITS 2 OF STILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM IS THE STORED PICTURES INTO TELEVISION-TYPE ELECTRON BEAM IS THE STORED PICTURES INTO TELEVISION-TYPE ELECTRON AGGINE CAN BE TRANSMITTED TO GROUND RECEIVES ON NAGINE CAN BE TRANSMITTED TO GROUND RECEIVES ON NAGINE CAN BE TRANSMITTED TO GROUND RECEIVES ON NAGINE CAN BE TRANSMITTED TO GROUND RECEIVES ON THE FULL STORED PICTURES ON THE TARER TIME. THE CAMERA HAS A SHUTTER SPREND OF 1.5 MILLISEC 2.0 NM. THE CAMERA HAS A SHUTTER SPREND OF 1.5 MILLISEC LIDEO-BANDWIDTH OF 62.5 KHZ. THE 500 LINE FRAME IS PRO- POR STORRED FOR THE TARGET INAGE TO BE ELECTRI- RRASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELLIFE'S ISS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PICC- THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 1 BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE- OR 233 MIG   | TIRDS 3  -TO ACQUIRE AND TRANSMIT PICTURES OF THE EARTH'S CLOUD TO PROVIDE METEOROLOGISTS WITH DETAILED INFORMATION ON THE CLOUD TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST TO R IN SPACE.  SO FILL CLOUD TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST SI 1-10 AND SIMILAR CONFICURATION ON ESSA 1, HOWEVER ON SIGNATION TO BE AND A FOLGE—PLANE SHORE LEGTRON BEAM SI 1-10 AND SIMILAR CONFICURATION ON ESSA 1, HOWEVER ON SI 1-10 AND SIMILAR CONFICURATION ON ESSA 1, HOWEVER ON SI 1-10 AND SIMILAR CONFICE CAMERA WERE USED. IT CONSISTS OF STILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM SO FILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM SO FILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM SO FILL PICTURES ON THE TUBE SCREEN. AN ELECTRON OF ONE THE CAMERA HAS A SHUTTER SPEED OF 1.5 MILLISSE CLOED-BANDWIDTH OF 62.5 KHZ. THE 500 LINE PRAME IS PRO- POR STORAGE IN 2 SEC. A MINIMUM INTERVAL OF 10 SEC BE- ICTURES IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRI- PRASED. THE CAMERA IS ALIGNED PORARLICL TO THE SATELLITE'S STHE SHITE REEL OF 32 PICTURES CAN BF ACCOMPLISHED IN SHARM ONDE ONLY WHEN DIRECTED TOWARD THE BARTH. TRANSMIS- BALLA OURSEAVED.  DO 235 AHZ.   | FULL REEL OF 32                   |
| TERM SPACE.  TERM SPACE.  THE CLOUD TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST ONE IN SPACE.  THE STORE THE SPECIFIC AREAS.***SECONDARY-TO TEST ONE IN SPACE.  THE STORE THE SPECIFIC AREAS.***SECONDARY-TO TEST ONE IN SPACE.  THE TOTAL CLOUD TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST ONE IN SPACE.  THE TOTAL STATEM HAS FLOWN IN AN IDENTICAL CONFIGURATION ONE STATEMEN SPECIFIES ON MAGNET STATEMEN SPECIFIES STATEMEN SHARE STATEMEN SKAND STATEMEN SPECIFIES STATEMEN SHARE STATEMEN SKAND STATEMEN SPECIFIES STATEMEN SHARE STATEMEN SHARE STATEMEN SKAND STATEMEN SHARE SHARE STATEMEN SHARE SH | TES OF EACUIRE AND TRANSHIT PICTURES OF THE BARTH'S CLOUD TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST TOR IN SPACE.  LES OF GOFRATION  THE STATE OF THE SPECIFIC AREAS.***SECONDARY-TO TEST TOR IN SPACE.  LES OF GOFRATION  THE TORS 3) 2 HIDE AND A FOR L-PLANE SHITTER THAT PERMITS  TO STILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM  TO STILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM  TO STILL PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAM  TO PROFILE STORED PICTURES INTO TELEVISION-TYPE ELECTRON BEAM  TO PRINCE ON BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND.  THE STORED PICTURES AND STORE UP TO 32 PICTURES ON MGG- THE CAN ALSO PROCESS AND STORE UP TO 32 PICTURES ON MGG- THE CAN BE STORED PICTURES AND STORE UP TO 32 PICTURES ON MGG- TO MG. THE CAMERA HAS A SHUTTER SPREED OF 1.5 MILLISEC  TO MG. THE CAMERA HAS A SHUTTER SPREED OF 1.5 MILLISEC  TO WE STORAGE IN 2 SEC. A MINIMUM INTERVAL OF 10 SEC BE- TICTURES IS REQUIRED FOR THE TARGET IRAGE TO BE ELECTRI- TRANSMISSION AND IS ALIGNED PARALLEL TO THE SATELLITE'S  THE RATHER REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN  THE RATHER REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN  THE BATTH'S THANSMITTER OPERATING AT NOMINAL PRE-  BEAN SOURCE OF THE CAMERA HAS A SUBJECT OF THE SATELLITE'S  THE BATTH PRIBANSMITTER OPERATING AT NOMINAL PRE-  BEAN SOURCE OF THE CAMERA HAS A SUBJECT OF THE SATELLITE'S  THE BATTH AND THE EARTH'S SURFACE.   | AN FILL INAMOULI                  |
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| ν ·  | ν ·  |                                   |
|  |  | 65, HISTORICAL REMARKS            |
| IGNALS, WHICH CAN BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND.  IGNALS, WHICH CAN BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND.  IETIC TAPE CAN ALSO PROCESS AND STORE UP TO 32 PICTURES ON MAG- REIC TAPE FOR TRANSMISSION AT A LATER TIME. THE CAMERA HAS A  IDE ANGLE(105 DEG) ELGRET F/1.5 LENS PRODUCING A RESOLUTION OF  'S TO 2.0 MR. THE CAMERA HAS A SHUTTER SPEED OF 1.5 MILLISEC  'S TO 2.0 MR. THE CAMERA TO 62.5 KHZ. THE 500 LINE FRAME IS PRO- RESSED FOR STORAGE IN 2 SEC. A MINIMUM INTERVAL OF 10 SEC BE- WEEN PICTURES IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRI- ALLY ERASED. THE CAMERA IS ALGOAD PARALLEL TO THE SATELLITE'S  SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PICC- FORE TAXING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS-  SION OF THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN  10 SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE-  11 DUENCY OF 235 MHZ.  12 PHENOMENA OBSERVED.   | SIGNAERTS THE STORED PICTURES INTO TELEVISION-TYPE ELECTRONIC STONNERS THE STORED PICTURES INTO TELEVISION-TYPE ELECTRONIC STORALS, WHICH CAN BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND. FOR SYSTEM CAN ALSO PROCESS AND STORE UP TO 32 PICTURES ON MAGNETIC TARE POR TRANSMISSION AT A LATER TIME. THE CAMERA HAS A #IDE ANGLE (105 DEG) ELGEET F/1.5 LENS PRODUCING A RESOLUTION OF #IDE ANGLE (105 DEG) ELGEET F/1.5 LENS PRODUCING A RESOLUTION OF #IDE ANDEO-BANDWIDTH OF 62.5 KHZ. THE 500 LINE FRAME IS PRO- TESSED FOR STORAGE IN 2 SEC. A MINIMUM INTERVAL OF 10 SEC BE- FUREN PICTURES IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRI- TALLY ERASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELLIFE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC- TORE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS- FOR STORAL OF THE BATTER REEL OF 32 PICTURES CAN BE ACCONDISHED IN ### PHANOMENA OBSERVED  **PHENOMENA OBSERVED * | IDENTICAL CAMERA                  |
| THE SYSTEM CAN ALSO PROCESS AND STORE UP TO 32 PICTURES ON HAG- INTECTABLE FOR TRANSMISSION AT A LATER TIME. THE CAMERA HAS A INDEANGLE (105 DEG) ELGEET F/1.5 LENS PRODUCING A RESOLUTION OF I. DE ANGLE (105 DEG) ELGEET F/1.5 LENS PRODUCING A RESOLUTION OF I. DE SERO WH. THE CAMERA HAS A SHUTTER SPRED OF 1.5 MILLISEC INDEANDRIDIN OF 62.5 KHZ. THE 500 LINE FRAME IS PRO- IESSED FOR STORAGE IN 2 SEC. A MINIMUM INTERVAL OF 10 SEC BE- INDEANGLING OF THE CAMERA IS ALIGNOM PRABLICL TO THE SATELLITE'S ALLY ERASED. THE CAMERA IS ALIGNOM PRABLICL TO THE SATELLITE'S ALIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC- TORE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS- ION OF THE BATIRE REEL OF 32 PICTURES CAN BR ACCOMPLISHED IN 100 SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL FRE- ILOUD COVER.AND THE EARTH'S SURPACE.   | FHE SYSTEM CAN ALSO PROCESS AND STORE UP TO 32 PICTURES ON MAGNETIC TARR FOR TRANSHISSION AT A LATER TIME. THE CAMERA HAS A NETIC TARR FOR TRANSHISSION AT A LATER TIME. THE CAMERA HAS A SHUTTER SPEED OF 1.5 HILLISEC AND A VIDEO-BANDWIDTH OF 62.5 KHZ. THE 500 LINE FRAME IS PRO-CESSED FOR STORAGE IN 2 SEC. A HINIMUM INTERVAL OF 10 SEC BE-CAMERA IS ALIGNED FOR THE SOUTHED FOR THE STOREST OF ELECTRI-CAMERA IS ALIGNED FOR THE SATELLITE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PICTURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMISSION OF THE RATIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN THOSE TAKING MODE ONLY WHEN DIRECTED TOWARD AND THE EARTH. THE NEW TAKENG MODE ONLY WHEN DIRECTED TOWARD AT THE PRANSMISSION OF THE BAND THE RANSMITTER OPERATING AT NOMINAL PRE-CALVED.   |                                   |
| IDE ANGLE (105 DEG) ELGRET F/1,5 LENS PRODUCING A RESOLUTION OF  5 TO 2.0 MR. THE CAMERA HAS A SHUTTER SPEED OF 1.5 HILLISEC  WIND A VIDEO-BANDWIDTH OF 62.5 KHZ. THE 500 LINE FRAME IS PRO- IESSED FOR STORAGE IN 2 SEC. A HINIMUM INTERNAL OF 10 SEC BE- WEEN PICTURES IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRI- ALLY ERASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITE'S  SPIN AXIS AND IS AUTOMATICALLY PRIGGERED SO AS TO BE IN A PIC- TORE TAXING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS-  SION OF THE ENTIRE REEL OF 32 PICTURES CAN BR ACCOMPLISHED IN  100 SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE-  11 OUD COVER.AND THE EARTH'S SURPACE.  | #IDE ANGLE (105 DEG) ELGRET F/1.5 LENS PRODUCING A RESOLUTION OP 1.5 FULL SEC.  AND THE CARRAM HAS A SHUTTER SPEED OF 1.5 HILLISEC.  AND A VIDEO-BANDWIDTH OF 62.5 KHZ. THE 500 LINE PRAME IS PRO-  EESSED POR STORAGE IN 2 SEC. A HINIMUM INTERVAL OF 10 SEC BE-  TWEEN PICTURES IS REQUIRED POR THE TARGET INAGE TO BE ELECTRI-  CALLY REASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELITE'S  SPIN AXIS AND IS AUTOMITCALLY TRIGGERED SO AS TO BE IN A PIC-  TORE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS-  SION OF THE BNTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN  DURACY OF 235 MAZ.  A PHENOMENA OBSERVED  CLOUR COVER AND THE EARTH'S SURFACE  |                                   |
| IND A VIDEO-BANDWIDTH OF 62.5 KHZ. THE 500 LINE FRAME IS PRO- IESSED FOR STORAGE IN 2 SEC. A MINIMUM INTERVAL OF 10 SEC BE- VAEN PICTURES IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRI- ALLY ERASED. THE CAMERA IS ALIGNAD PARALLEL TO THE SATELLITE'S ARIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC- FURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS- SION OF THE BATIRE REEL OF 32 PICTURES CAN BR ACCOMPLISHED IN 100 SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE- 11 OUD COVER. AND THE EARTH'S SURPACE.  | AND A VIDEO-BANDWIDTH OP 62.5 KHZ. THE 500 LINE FRAME IS PRO- CESSED FOR STORAGE IN 2 SEC. A HINIMUM INTERVAL OF 10 SEC BE- TWEEN PICTURES IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRI- CALLY ERASED. THE CAMERA IS ALIGNAD PARALLEL TO THE SATELLITE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC- SION OF THE BYTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE- PHENOMENA OBSERVED.  CALQUE COVER, AND THE RARTH'S SURFACE  |                                   |
| ASSED FOR STORAGE IN C. S.C. A HINTHON INFORMAL OF TO SEE SECTRI- WEEN PICTURES IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRI- ALLY ERASED, THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC- TORE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH, TRANSMIS- ION OF THE BATIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN DURICY OF 235 MHZ.  2. PHENOMENA OBSERVED  32. PHENOMENA OBSERVED  33. PHENOMENA OBSERVED   | THEN PICTURES IN 2 SEC. A HINTON INDENTAL OF 10 SEC BE- THEN PICTURES IS REQUIRED FOR THE TARGET IN SECTION BE ELECTRI- CALLY ERASED, THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC- TURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH, TRANSMIS- SION OF THE BUTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN ALCOUR A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE- RHENOMENA OBSERVED.  TO SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE- THENOMENA OBSERVED.   |                                   |
| AALLY ERASED, THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITE'S JEIN AXIS AND IS AUTOMATICALLY TEIGGERED SO AS TO BE IN A PIC- JEIN AKIS HODE ONLY WHEN DIRECTED TOWARD THE EARTH, TRANSMIS- SION OF THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SEC BY A 2-WATT PM TBANSMITTER OPERATING AT NOMINAL PRE- 11. OUR COVER, AND THE EARTH'S SURPACE.  | CALLY ERASED, THE CAMERA IS ALIGNED PARALLEL TO THE SATELLIFE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC- TURE TAKING HODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS- SION OF THE BNTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE- PHENOMENA OBSERVED. 2. PHENOMENA OBSERVED. 2. CLOUR COVER, AND THE RARTH'S SURFACE   |                                   |
| ORE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS- SION OF THE BATIRE REEL OF 32 PICTURES CAN BR ACCOMPLISHED IN 100 SEC BY A 2-WATT PR TRANSMITTER OPERATING AT NOMINAL PRE- 31. PHENOMENA OBSERVED. 32. PHENOMENA OBSERVED.  | TURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMIS- SION OF THE BATTER REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SEC BY A 2-WATT PM TRANSMITTER OPERATING AT NOMINAL PRE- DURKLY OF 235 MAZ. A PHENOMENA OBSERVED CLOUD COVER AND THE RARTH'S SURFACE   |                                   |
| THE EARTH'S SURFACE  | THE EARTH'S SURFACE  |                                   |
| THE EARTH'S  | THE EARTH'S  |                                   |
| THE EARTH'S  | THE EARTH'S  | 22 4000                           |
|  | S. MEABUREMEN. Links   |                                   |
| TO 8 LEVELS OF GRAY  | 7 TO 8 LEVELS OF GRAY  |                                   |
|  | 33. MEASUREMENT ANGUE AT TO 8 LEVELS OF GRAY 34. PRECISION AND ACCURACY  | 2 H 2                             |

| <u></u>   | 35. SPECTRAL RANGE   |
|---|--|
|   | 0.5 TO 0.65 MICRC  |
|   | F VIEW 39. GROUND SWATH  |
| 70  | 40. NO. BY 74.0 DEG 750 NR 750 NR FROM 475 NR ALTITUDE   |
| ,   | INE PROM 475 NM  |
| 1 4   | 44. ALTITUDE   |
| احا   | MED CIRCULAR MEDIUM POSIGRADE  |
| _   | 46. SPECIAL REQUIREMENTS   |
| _   | 47. COMPONENTS   |
| 7   | V CAMERA, TRANSHITTER, TAPE RECORD   |
| ,   | 171  |
| 딝   | 7 LB ANGNETIC S NUCLEAR STATES NONE  |
| _   | 56. INTERFERENCE   |
| 1   | 1 1111   |
| <del>                                      </del> | NO IN-PLIGHT CALIBRATION DELAYED AND REALTIME DAYSIDE OF ORBIT   |
| ा   |  |
|   | FULL REEL OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING AN FR TRANSMITTER OPERATING AT PREQUENCY OF 235 MHZ. |
| 7-  | 63. ADVANTAGES AND LIMITATIONS   |
| 7   | SNOWTHER GAVOT CHOID AC OF   |
|   | KEATHER ANALYSIS THAN PROM MED OR NARROW AND   |
|   |  |
|   | 1) SIGNIFICANT ACHIEVEMENTS IN SAT MET 1958-1964, NASA SP-96,***   |
|   | OR LIRON I.  |
| $\overline{}$                                     | NACTICS, V.S. CONE 1900.***S)BEDNER, B.H. AND STANLSKENKE, C.:   |
| 7-  |  |
|   | SSA) ASHEVIL   |
| v   | EMAHKS   |
|   | IDENTICAL CAMERA FLOWN ON TIROS 1-10; SIMILAR CAMERA ON ESSA 1   |
|   | 66. DIAGRAMS   |
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IROS A

| INSTRUMENT RESUME  | AL RANGE  |
|--|---|
|  | 30.0 TO 50.0 MICRONS SEE ITEM 31 38 FIELD OF VIEW DEG 430 NM DIAM CIRCLE PROM 450 NM ALTITUDE 50.0                                    |
|  | RESOLUTIONAL, SPATIAL RESOLUTION  |
| LUTION NONSCANNING RADIOMETER LRNR   | CENTER PROM 450 NM  |
| (TITLE CONT.) 4. RESUME B. VIGGOV BOANE B. VIGGOV BOANE B. VIGGOV BOANE B. VIGGOV B. VIGOV B. VIGGOV B. VI | 42 POINTING ACCUPANT 153 POINTING RATE 144 ALTITUDE 145, INCLINATION NED TO CIRCULAR MEDIUM POSIGRADE                                 |
| 8. TELEP   |   |
| GODDARD SPACE PLT CENTER   |   |
| 10. ORGANIZATION   |   |
| STARPEL DR. R. A. GUDDAKU SPACE FLI CENIER SULTOC 010.3  | 48. WEIGHT AS, VOLUME AS AVERAGE POWER SISTANDAN POWER SS. PEAK POWER SS. MITER   |
|  | 2 LB 5 WATTS 30 WATTS:  |
| 20.PGM OFFICE  | 64. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 56. SHIELDING   |
| I. H.L. NASA   | A CALIDDATION IN DATA RECOVERY IN ERECT PAYON OF ORSERVATION  |
| DADES DESTRUBBOTE CO STREET CONN. 02/62 NA   | NCE RESTSTORS DELAYED TELEMETRY   |
| Town Town Town Town Town Town Town Town  |   |
| 2-CHANNEL NON-SCANNING LOW-RESOLUTION INPRARED   | UENCY BANDS ARE USED FOR TOTAL IR P   |
| PLICATION  | THE / CHANNELS HAVE A TOTAL WIDTH OF 310 HZ.  |
| WEY TIROS 4  | 63 ADVANTAGES AND I MITATIONS   |
| SU PURPOSE   | CONTRACTOR OF THE PROPERTY CONTRACTOR AND CARDEST THE CHIEF   |
| THE  | COATING AND CONE OPTICS INADEGUATE IN SPECTRAL  |
| BLACKBODY TEMPERATURES AND ALBEDO OF THE EARTH.  |   |
|  | 1) IN AND REFLECTED SOLAR HADIATION BEASUMERENTS FROM TIMOS 2 BET<br>SAT. NASA IN D-1096, NOV. 1961.***2) BANDEEN, W.R.: EXPERIMENTAL |
| 20   | APPROACHES TO REMOTE ATMOSPHERIC PROBING IN THE IR FROM SATS.   |
| 31. PRINCIPLES OF OPERATION  | NASA TH X-63188, MAY 1968.***3) BARTKO, F., ET.AL.: TIROS LOW   |
| RADION   | RADIOMETER. NASA TN D-614,  |
| TIROS 2  | ABLE FROM MUKLU DATA CENTER, ASHEVILLE, N.C.  |
| DEFECTORS. ONE OF THESE TO A BEACK THERMISTOR BULCUEIER USIDELOR   | TRENTICAL INSTRUMENT PLOUN ON TIROS 2, 3, AND 4   |
|  | i   |
| SITIVE, TO REPLECTED SUNLIGHT AND TO LONG WAVE TERRESTRIAL RADIA-  |   |
| TION (0.2 TO 50 MICRONS). THE WHITE DETECTOR IS COATED TO BE RE-   |   |
|  |   |
| LONG WAYRURACTH THERMAL RADIATION (5 TO 50 DICKONS). THESE DE-   |   |
|  |   |
| THE PIELD WHEN VIEWING   |   |
| -  |   |
| U  |   |
| WHICH IS WITHIN THE FIELD OF THE MIDE ANGLE TELEVISION CAREKA.   |   |
| HAL IS USED TO MODULATE SEPARATE AUDIO-PREQUENCY OSCILLATORS.  |   |
| THIS HODILATED OUTPUT IS PROCESSED THROUGH THE TIME-SHARING  |   |
| SHITCHING CIRCUIT WITH THE OUTPUT OF THE SCANNING RADIOMETER.  |   |
| 32. PHENOMENA OBSERVED   | -   |
| THERMAL AND REPLECTED SOLAR RADIATION FROM THE BARTH   |   |
| 33. MEASUHEMENT RANGE  |   |
| = 100 DKG C TO +60 DKG C   |   |
| S/N BETTER THAN 30 DB  |   |
| The state of the s |   |

| NATIONAL                                      |  | ESUME  | NO  | 36. SPECT           |
|---|--|--|---|---------------------|
|   | ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | CH CENTER<br>HUSETTS                                     | - 1   | 38. FIELD           |
| LOW-RESOLUTION OBNID                          | OMNIDIRECTIONAL RADIC  | RADIOMETER   | LROR 3. EXP NO  | NA NA               |
|   |  |  | (   |                     |
| 6. PRINCIPAL INVESTIGATOR                     | 7. ORGANIZATION  |  | 8. TELEPHONE  | NA<br>46. SPECIA    |
| W. B.   | UNIVERSITY OF I  | WISCONSIN  | 608-262-5938  | 47. COMPC           |
| PARENT DR. R. J. U                            | UNIVERSITY OF WISCONSIN  | WISCONSIN  | 608-262-5938  |                     |
|   | چ<br>چ   | 20.PGM OFFICE 21. TELEPHONE                              | 21. TELEPHONE   | C 25                |
|   | NASA HDQTRS  | OSSA/SRO   | 202-962-4291  |                     |
| UNIVERSITY OF WISCONSIN                       | -  | SCONSIN  | 02/62 NA  | S. CALIB            |
| R OHNID                                       | AND CONTROL IR OHNIDIRECTIONAL NON-SCANNING LOW-RESQUUTION   | SCANNING LOW-R   | П   |                     |
|   |  | TIROS  | 77  |                     |
| EASURE  | PRIMARY- TO MEASURE THE GROSS HEAT BUDGET OF   | 1  |   | 63. ADVA            |
| DEFERALI                                      | E HOW MUCH SO<br>BY THE EARTH  | ENERGY<br>ITS ATM  | GY IS ABSORBED, RE-<br>ATMOSPHERE AT THE  | 64. REFER           |
| UPPER BOUNDARY; THUS<br>CIRCULATION OF THE A1 | TO STUDY THE INOSPHERE.  | IE DA  | IG PORCE OF THE   | 1) HOU:             |
| PRINCIPLES OF OPERATION                       |  |  |   | THE E               |
| SHT WAS                                       |  | NTICAL CON   | ON  |                     |
| 7, AND WAS ALSO DEG POV) LOW-R                | AND 7, AND WAS ALSO SIMILAR TO ONE ON EXPLORER 7. (180 DEG POV) LOW-RESOLUTION IR DETECTION DEVICES,                     | SIMILAR TO ONE ON EXPLORER<br>SOLUTION IR DETECTION DEVI | H   | NASA/               |
| BLACK-  | COMPOSED OF A BLACK-AND-WHITE BOLOME<br>ARE MOUNTED 180-DEGREES APART ON TEI   | BOLOMETER AND A REPLECTION TELESCOPING SUPPORTS          | £Ω  | FIRST<br>66. DIAGR. |
| PROM THE SIDE OF                              | OF THE SPACECRAPT.<br>BADIATION EMITTED  | r. THE MII<br>D BY THE SA                                | MIRRORS SHIELD EACH SATELLITE'S BODY.   |                     |
| ERS HAVE                                      | BOTH BOLORETERS HAVE A HIGH ABSORPTIVITY TO THE IR RADIATION PROM THE EARTH. THE BLACK BOLOMETER ALSO HAS A HIGH ABSORPT | IVITY TO THE ALSO HAS                                    | ΙΛΙ   |                     |
| RADIATI                                       | TEMPERATURES AR  | CTED AND EI<br>RE MEASUREI                               | TY FOR SOLAR RADIATION. THUS REFLECTED AND EMITTED RADIATION IS WEASURED. THE SENSOR TEMPERATURES ARE MEASURED BY THERMISTORS |                     |
| TO THE INSIDE                                 | FASTERED TO THE INSIDE OF THE HEALSPHEAL SHELLS. MATCHED OF THERMISTORS ARE CONNECTED IN SERIES WITH SIMILAR SENSORS     | PHERIC SHELLS.<br>IES WITH SIMIL                         | LLS. MATCHED PALKS  |                     |
| SS OF THE                                     | OPPOSITE SIDES OF THE SPACECRAFT. THEREFORE, THE SENSOR TEMPERATURE RECEIVED FROM THE SATELLITE IS                       | THEREPORE,<br>E SATELLITI                                | THE MEASURED<br>I IS AN AVERAGE OF  |                     |
| URES FROM                                     | THO TEMPERATURES PROM MATCHED THERMISTORS AND RESPONSE OF AN ISOLATED SPHERE IN SPACE. THE                               | ISTORS AND<br>PACE. THE                                  | SIMULATES THE INFORMATION   | ·····               |
| TO EARTH                                      | EARTH INCLUDES TEMPERATURES VIED RESISTANCE VALUE WHICH  | Sa   | OF THE MIRRORS AND<br>ALLOWS ONE TO   |                     |
| DRIE  | OF THE EL  | 1  | SATELLI   |                     |
| RADIANT ENERGY REPLECTED                      | CTED AND EMMITTED  | BY THE   | EARTH.  |                     |
| 128 DEG K TO 488 DEG                          | ×  |  |   |                     |
| PRECISION AND ACCURACY                        |  |  |   |                     |
| O. 1 KELVIN DEGREE                            |  |  |   |                     |
|   |  |  |   |                     |

|          | A SPECTRAL RESOLUTION 37. TIME CO  |
|----------|--|
|          | 13 TO 60.0 MICRON NA 5. SECONDS  |
|          | 180.0 DEG  |
| 9        |  |
|          | A ALTERING SATE A ALTERING A MICHAELING  |
| =        | AN CANADATA CANADATA AN ANA CANADATA ANA CA |
| П        | PECIAL REQUIREMENTS  |
| $\top$   | 47, COMPONENTS   |
| П        | DETECTION DEVICES, ELECTRONICS   |
| _<br>Ti  | 4T 49. VOLUME 50. AVERA  |
| EI-      | 3 LB MAGNETIC NUCLEAR HERMAL 18. NUCLEAR 14-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-   |
| 7-1      |  |
| T-       | 199. CALIBRATION 60. DATA HECOVERY 161. FREUDENCY OF OBSERVATION   |
| T        |  |
| <u>U</u> | IS AND OTHER IR EXPTS ON-BOARD ARE RECORDED  |
| 7        | CONTINUOUSLY FOR ONE ORBIT ON MAGNETIC TAPE FOR PLAYBACK ON  |
|          | GES AND LIMITATIONS  |
| _        |  |
|          | 164. REFERENCES  |
|          | HOUSE, F. B. RADIATION BALANCE OF THE BARTH  |
|          | SIS, U. OF WISC. 1965. ***2) VONDERHAAR, T.H., VARIATI   |
|          | RADIATION BUDGET, PHD THESIS, U. OF WISC. 1968.**  |
| 1        | TLAN TIROS 7, GSFC RPT NO. X-650-63-99,  |
| ν ω      | 4) DATA AVAILABLE FROM NATIONAL SPACE SCIENCE DATA CENTER,   |
| -        | 65, HISTORICAL REMARKS   |
| ~`.      | FIRST MEASUREMENTS PROM S/C OF PARTH'S TOTAL RADIATION BUDGET.   |
| <u></u>  | ise, DIAGHAMS  |
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| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | 36. SPECTRAL RANGE 35. SPECTRAL RESOLUTION 37. TIME CONSTANT 0.25 TO 12.0 MICRONS SEE ITEM 31 38. FIELD OF VIEW 39. GROUND SWATH   |
|--|--|
|  | 5.0 DEG 35 NM DIAM CIRCLE PROM 450 NM ALTITUDE   |
|  | RESOLUTION 41, SPATIAL RESOLUTION  |
| ESOLUTION BADIOMETER   | NM AL  |
| (TITLE CONT.)  A. DATE  11/10/69 0005  | 42, POINTING ACCURACY 43, POINTING RATE 44, ALTITUDE 45, INCLINATION DOSTGRADS   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   |  |
| NORDBERG, DR. W. GODDARD SPACE FLT CENTER 301-982-5003   |  |
| 10. ORGANIZATION   |  |
| ONTRACT 11 PARTITION IN CARAMILLE IN CONTINUES IN START INCOMITION OF ATTIC  | RADIOMETER (5 THERMISTOR BOLOMETER DETECTORS) - ELECTRONICS  |
| TOTAL NOW OR THE TOTAL INC. TOTAL TO |  |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE   | 26 55 INTERFERENCE 56 INTERFERE  |
| OSSA/SRO   202-962-  | SENSITIVE  |
| 23 LOCATION  | 60. DATA RECOVERY  |
| BARNES ENGINEERING CO STAMFORD, CONN. 11/60 NA   | SPACE LOOK FOR ZEROING DELAYED TELEMETRY CONTINUOUS  |
| 5-CHANNEL THERMISTOR-BOLOMETER MED-RES SCANNING  |  |
| 29. SPACECRAFT   | •  |
| MET TIROS 4  | CITY AS ANTI- CITY OF THE CONTRACT OF THE CONT |
|  |  |
| PRIMARY-TO MEASURE EMITTED THERMAL AND REFLECTED SOLAR RADIATION   | AN UNCERTAINTY EXISTS IN THE ABSOLUTE VALUES OF THE REASUREMENTS DESCRISE OF NO INVITED OF ALTROADION  |
| , A  | BA. REFERENCES   |
| D THERMAL B  | 4 RADIATION DATA CATALOG AND USER'S MANUAL.  |
| TO GENERATE RADIATION MAPS FOR RESEARCH IN ATMOSPHERIC PROPER-   | DATA CATALOG OF SATELLITE AND ROCKET EXPTS.  |
| TIES.  31. PRINCIPLES OF OPERATION   | NATIONAL SPACE SCIENCE DATA CENTER, REFORT NO. NOSDC 08-01, JAN.   |
| THEORY OF A 12 A NO STREET OF CONTRACTOR OF CHANNET ACANATAC DADICAL   | COORD ATT A COLUDERS, I. OBT INDIRCEDING FOR DRIEDLIED. NACH.  |
| E  | DATA CENTER, NASA/GSFC.  |
| OMETER, WHILE SIMILAR IN PURPOSE, WAS A NEW INSTRUMENT DESIGN.ON   | 65. HISTORICAL REMARKS   |
| PLIGHT,  | SIMILAR RADIOMETERS PLOWN ON TIROS 2,3,4,7 AND NIMBUS 2 (MRIR)   |
| TIROS 4 THEY WERE: 6.0-6.5;8.0-12.0;0.2-6.0;TIME REF CHANNEL; AND  | 66. DIAGRAMS   |
| 0.55-0.75 MICRONS.A REPERBNCE LEVEL WAS OBTAINED BY HAVING THE   |  |
| THE DETECTORS ALTERNATELY LOOK INTO SPACE AT A 45 DEGREE ANGLE.  |  |
| CHANNEL HAS THE SAME PAINCIPLE OF OPERALION: THE ALLERNALING CONTAINS TO SECTION ALLERNALING   |  |
|  |  |
| MPINGENT UPON  |  |
| THAT HAS ALTERNATE BLACK AND MIRRORED HALVES.  |  |
| DISKS ROTATE SIMULTANEOUSLY AT 46 RPS, AND HAVE IDENTICAL OUTPUT   |  |
| SCURDERS, SATELLIE<br>IS THEN ADVANCED BY  |  |
| ENT HAS A 5 DEG POV F  |  |
| ARE RECORDED ON THE SATELLITE'S  |  |
| MAGNETIC TAPE FOR A PERIOD OF 100 MIN.   |  |
|  |  |
|  |  |
| BADIATION FROM CARTH AND ATHOSPHERE IN 5 SPECTRAL REGIONS 33 MEASUREMENT RANGE   |  |
|  |  |
|  |  |
| A S/N RATIO OF BETTER THAN 30 DB; ABSOLUTE ACCURACY OF +-/ DEG K   |  |

| INSTRUMENT RESUME   | RANGE  |
|---|--|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE. MASSACHUSETTS                              | TO 0.65 MICRONS NA  39. GROUNDSWATH  THE CO STATE OF NA THE COLUMN BEONE HED NA  |
| 1, TITLE 2.ACHONYM 3. EXP NO  | NA PROG  |
| VIDICON CAMERA SYSTEM   | -LINE FROM 450 NM  |
|   | 42. POINTING ACCUPACY 43. POINTING HAIE 45. ALTITODE 45. INCLINATION DOCTORNO  |
| 7. ORGANIZATION 8. TELEPHONE  | TOTATH WHATCH  |
| RADOS, R. H. (MGR.) GODDARD SPACE FLT CENTER 301-982-5347   | 4). COMPONENTS   |
|   | TRANSMITTER, TAPE RECOR  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATE 16 CONTRACT NUMBER 15. SATE 16. CONTRACT NUMBER 15. SATE      | VOLUME 50. AVERAGE POWER 51, STANDBY POWER 52, PE  |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE   | 54. INTRAFERENCE 55. INTERFERENCE 55. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 56. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. |
| GARBACZ, M.L. NASA HDOTRS OSSA/SRO 202-962-4291   | SENSITIVE 60 DATA  |
| TRO-ELECTRONICS PRINCETON, NE   | HT CALIBRATION DELAYED OR REALTIME   |
| INCH MEDIUM ANGLE F/1,8 VIDICON   | PULL REEL OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING  |
| 28. SPACECHAFT MATH   | 0  |
| APOSE.  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY-TO PROVIDE PICTURES OF BARTH'S CLOUD COVER AND INVESTI-   | BROAD SYNOPTIC VIEWING OF CLOUD-COVER PATTERNS, VALUABLE FOR   |
| SECONDARY-TO CONFIRM THE CAPABILITY OF USING A WEATHER SATELLITE  | 1 CE SAUUL AND LED ACKURALSSANKE.  |
| FOR ICE RECONAISSANCE.  | 1) SIGNIFICANT ACHIEVEMENTS IN SATELLITE METEOROLOGY, 1958-1964,   |
|   | SP-3028.***3) NASA NEWS RELEASES FOR TIROS 4, 5, 6. RELEASE NO'S   |
|   | 62-24; 62-136; 62-194. *** 4) DATA AVAILABLE FROM NATIONAL WEATHER   |
|   | RECORDS CENTER (ESSA) ASHEVILLE, N.C.  |
| TICAL CONFIGURATION, ON TIROS 5 AND 6. IT CONSISTS OF A 1/2-INCH VIDICON TUBE AND A FOCAL-PLANE SHUTTER THAT PERMITS STORAGE OF | 65. HISTORICAL REMARKS   |
| STILL PICTURES ON THE TUBE. SCREEN. AN ELECTRON BEAM CONVERTS THE   | IDENTICAL INSTRUMENTS PLOWN ON TIROS 4, 5, AND 6.  |
| STORED PICTURES INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH  | 66. OLAGRAMS   |
|   |  |
| POR TRANSMISSION AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE   |  |
| ( / b DEGREES) TEGER F / 1.8 LENS PRODUCING A RESOLUTION OF ABOUT   |  |
| LINE FRAME IS PROCESSE  |  |
| FOR STORAGE IN 12 SECS. A MINIMUM INTERVAL, BETWEEN PICTURES, OF  |  |
| CAMERA IS ALIGNED PARALLEL TO THE S   |  |
| AS  |  |
| THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SEC-  |  |
| FING AT A NOMINA  |  |
| עו ליו ווווף.   |  |
| 22. PHENOMENA OBSERVED  |  |
| ULDOUD LOYER OF THE ERRIN'S SURFACE   |  |
| 7 TO 8 LEVELS OF GRAY   |  |
| 34. PHECISION AND ACCURACY  |  |
|   |  |

| INSTRUMENT RESUME  | 36. SPECTRAL RESCLUTION 37. TIME CONSTANT O IL MO O 65 MITSONS IN I               |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | VIEW 39. GROUND SWATH   |
| CAMBRIDGE, MASSACHUSETTS   | 74.0 BY 74.0 DEG 750 NM BY 750 NM PROM 475 NM ALTITUDE                            |
|  | RESOLUTION 1. SPATIAL RESOLUTION  |
| VIDICON CARBEA SISTER  | 20 DEG 1.5 NM PER TV-LINE FROM 4/5 NM ALTITUDE                                    |
| DATE 11/10/KG  | MEN CTOCHTAN  |
| A 7. ORGANIZATION B. TELEP!  | CTUCKTRY CHESTON  |
| В.)  |   |
| P. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE  |   |
| TGAT2  | RA, TRANSMITTER,  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. SATE 16. CONTRACT STATUS   | 49. VOLUME 50. AVERAGE POWER 81. STANDBY POWER 152. PEAK                          |
|  | 7 LB: MAGNETIC NUCLEAR THERMAL S.C.   |
| MACA GOODO OCCA CODO   | 194 INTERPERENCE 195 INTERPERENCE 196 INTERPERENCE 197 INTERPERENCE 198 SHIELDING |
| ],   | 60. DATA RECOVERY   |
| PRO-ELECTRONICS PRINCETON, NEW JERSEY  | SHT CALIBRATION DELAYED AND REALTIME  |
|  | 62. TELEMETRY REGUIREMENTS  |
| .5-INCH HIDE-ANGLE P/1.5 LOW-RESOLUTION VIDICON  | PULL REEL OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING                     |
| PLICATION 29. SPACEC   | 60  |
| MET TIROS 4  |   |
| AU. PUHYOSE  |   |
| PRIMARY-TO ACQUIRE AND TRANSMIT PICTURES OF THE EARTH'S CLOUD  | CLOUI   |
| TRUTATION OF THE STREET OF THE STREET | 19. REFERENCES  |
| TV SENSOR IN SPACE   | 1) STENIFICANT ACHIEVERPRITE IN SAT MET 1958-1964 NASA SD-96 ###                  |
|  | 2) GOLDBERG, E.A. AND LANDON, V.D.: KEY EQUIP FOR TIROS 1. ASTRO                  |
|  | NAUTICS, V.5, JUNE 1960.***3) MESNER, M.H. AND STANISZEWSKI, J.:                  |
| ı  | TV CAMERAS FOR SPACE EXPLOR. ASTRONAUTICS, V.5, MAY 1960. ***                     |
| AN IDENTICAL CONF  | AND SPACECRAFT, NASA SP-3028,   |
| ON TIROS 1-10 AND SIMILAR CONFIGURATION ON ESSA 1. ON TIROS 1-8,   | AVAILABLE PROM NATIONAL WEATHER RECORDS CTR (ESSA) ASHEVILLE, NC                  |
| ₹.   | JEMARKS   |
| MITERIAL THROUGH THE BANK PLATE. IT CONSISTS OF A 1/2-IN VIDICON   | IDENTICAL CAMERA FLOWN ON TIROS 1-10. SIMILAR CAMERA ON ESSA 1.                   |
| ON THE THERE SHOTTEN THEFT   |   |
| ATTORNO DICTION OF THE FOLD CONTROL OF THE CONTROL OF THE CATORNO DICTION OF THE CATORNO DI |   |
|  |   |
| AND STORE UP TO 32 PIC   |   |
| U.   |   |
| DEG ELGERT F/1.3 LENS PRODUCING A RESOLUTION OF 1.4 TO 2.0 NM.   |   |
| - 4  |   |
| SEC BETWEEN PICTURES IS  |   |
| QUIRED FOR THE TARGET INAGE TO BE ELECTRICALLY ERASED. THE CAMERA  |   |
| IS ALIGNED PARALLEL TO THE SATELLIE'S SPIN AXIS AND IS AUTO-<br>MATICALLY TRIGGERRED SO AS TO BE IN A PICTURE TAKING MODE ONLY   |   |
| -  |   |
| ACCOMPLISHED IN 100 SEC BY A 2-WATT B  |   |
| TRANSBITTER OPERATING AT A NOMINAL PREGUENCY OF 235 MHZ.   |   |
| CLOUD COVER AND THE BARTH'S SURPACE  |   |
| 33. MEASUREMENT RANGE  |   |
| 7 TO 8 LEVELS OF GRAY  |   |
| 34 PRECISION AND ACCURACY  |   |
|  | T.  |

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| CAMBRIDGE, MASSACHUSETTS   | ELECTRONICS RESEARCH CENTER  SYSTEM  S. ORGANIZATION  S. D. ORGANI | INSTRUMENT RESUME  125. SPECTRAL RANGE  NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  0.5 TO 0.  |
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| TONGAMIZATION    1. ORGANIZATION   A. CARTER   A. CART | TORONICAL AND EARTH'S CLOUD COVER AND INVESTIGNATION  TORONICATION  TORO | ELECTRONICS RESEARCH CENTRAL CAMBRIDGE, MASSACHUSETTS 56.0 BY 56.0  |
| THEM  1. CORGANIZATION  1. COR | TONGER AND STERM STEEPHONE STREET STR | 2. ACRONYM 3. EXP NO  |
| TORGANIZATION  11/10/69 0004  GODDARD SPACE FLT CENTER 301-982-5347  11 ASA HOUTES  RASA HOUTES  RECEART  RASA HOUTES  RASA RASA RASA HOUTES  RASA RASA RASA RASA HOUTES  RASA RASA RASA HOUTES  RASA RASA RASA RASA HOUTES  RASA RASA RASA RASA RASA RASA HOUTES  RASA RASA RASA RASA RASA RASA RASA RA   | TO PROMIZATION  1. ORGANIZATION  1. ORGA | VCSM 0.12   |
| TO GROANIZATION  TO GODDARD SPACE FLT CENTER 301-982-5347  TO GODDARD SPACE FLT CENTER STATUS  TO GODDARD SPACE FLT CENTER TELEPHONE  TO GODDARD SPACE STATE FLEATHORY STATUS  TO GODDARD SPACE STATE FLOOR TO GODE TO GODDARD SPACE STATE | TO PECANUZATION  1. ORGANIZATION  2. ORGANIZATION  2. ORGANIZATION  3. ORGANIZATION  4. ORGANIZATION  5. ORG | 4. HESUME 5. VERSION 42. POINTING ACCU  |
| GODDARD SPACE FLT CENTER 301-962-5347   Incorrection   Incorrect   | TINUMBER 1. FLASH INDEX NUMBER 1. TREEPHONE  18. AGENCY  18. AGENC | 7. ORGANIZATION 8. TELEPHONE  |
| THE CALLY THE CAPABEL OF THE STATE OF THE STATE OF THE CAPABEL OF THE STATE OF THE CAPABEL OF STATE OF | THE THE THE THE THE THAT PERHITS STATE    18 AGENCY  | GODDARD SPACE FLT CENTER 301-982-5347   |
| 18 AGENCY   18 FLEEP OFFICE   18 AGENCY    | TON THE THE CAPABLLY OF STATUS  IN AGENCY  IN A A A A A A A A A A A A A A A A A A A   | 18. CREATION  |
| 19. AGENCY   20. FGM OFFICE   21. TELEPHONE   22. LOCATION   22. LOCATION   22. LOCATION   23. LOCATION   24. EACT   24.   | THE THE CAPERCY TO SO FOR OFFICE ATTEREPONE  IN A GENCY  IN A GENC | 19. CONTRACT NUMBER 14. FLASH INDEX NUMBER 16. START 18. CONTRACT NUMBER 19. STATUS   |
| HASA HDOTRS   OSSA/SRO   202-962-4291  | INEDIUM—ANGLE F/1.9 VIDICON  TOWNICS PRINCETON, NEW JERSEY 06/62 NA SECOND OF 1/2 NA NA SECOND OF 1/2 NA NA NATITER OPERATING AT A NOMINAL PREFITED OF 1/2 NA NA NATITER OPERATING AT A NOMINAL PREFITURE OF 1/2 NA NA NA NA NA NATITER OF 1/2 NA  | 19. AGENCY 20. PGM OFFICE 21. TELEPHONE   |
| WICES PRINCETON, NEW JERSEY OG/62 NA HERITAGE PAIR AND INVESTIBLE TINGS STATEMENT OF USING A WEATHER SATELLITE AGES OF HURRICANES AND ATMOSPHERIC MOTIONS, ***  IRM THE CAPABILITY OF USING A WEATHER SATELLITE AND THE CAPABILITY OF USING A WEATHER SATELLITE AND THE THE SHUTTER THAT PERHITS STORAGE OF THE THE THAT PERHITS STORAGE OF THE THE STORAGE OF THE THE THAT PERHITS STORAGE OF THE THE THE THE THE STORAGE OF THE THE THE STORAGE OF THE STORAGE OF THE THE THE STORAGE OF THE THE STORAGE OF THE  | THE PLOTAGE PAIR JERSEY OF A STATE OF A STATE OF A STATE OF BENEFICE OF BENEFICE OF BENEFICE OF TIROS 5  TIROS 5  TIROS 5  TIROS 5  TIROS 5  TIROS 5  TIROS 6  TIROS 6  TIROS 7  TIROS 7  TIROS 7  TIROS 7  TIROS 7  TIROS 8  TIROS 8  TIROS 9  TIROS 10  TIR | IN. L. HASA HDOTRS OSSA/SRO 202-962-4291  |
| TIRED TOWN—ANGLE F/1.8 VIDICON  TIROS 5  E PICTURES OF EARTH'S CLOUD COVER AND INVESTIBLES OF HURRICANES AND ATMOSPHERIC MOTIONS. ***  IRM THE CAPABILITY OF USING A WEATHER SATELLITE ANCE.  NOT TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH A POCAL-PIANE SHUTTER THAT PERRITTS STORAGE OF THE TUBE SCREEN. AN BLECTRON BEAM CONVERTS THE NOT PELEVISION-TYPE BLECTRONIC SIGNALS, WHICH AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE A SHUTTER SPEED OF 1.5 MILLISECONDS AND OP 62.5 KHZ. THE SPEED OF 1.5 MILLISECONDS AND OP 62.5 KHZ. THE SPEED IN A PICTURES, OF THE DIGNED POR THE TRANELLY TRIGGERED SO AS TO BE IN A PICTURE HERD DIRECTED TOWARD THE EARTH. TRANSMISSION LOP 32 PICTURES CAN BE ACCOMPLISHED IN 100  IT PR TRANSMITTER OPERATING AT A NOMINAL PRE-   | TIROLUM-ANGLE F/1.9 VIDICON  TIROS 5  TIROS 5  TIROS 5  TIROS 5  TIROS 5  TIROS 6  TIROS 6  TIROS 6  TIROS 7  TIROS 7  TIROS 7  TROPELLITE  TO BELLITE  TO BELLITE  TO BELLITE  TO BELLITE  TO TELEVICION CAMERA SYSTEM WAS ALSO FLOWN, IN IDEN- TION, ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH  TO A FOCAL-PLANE SHUTTER THAT PERMITS STORAGE OF  NA THE TUBE SCREEN. AN BLECTRON BEAM CONVERTS THE TOTO TELEVISION-TYPE BLECTRONIC SIGNALS, WHICH TO STORE UP TO 32 PICTURES ON MAGNETIC TAPE TA LATER TIME, THE CAMERA HAS A MEDIUM ANGLE TAR A SHUTTER PRODUCING A BEDUUT THAS A SHUTTER PRODUCING A BEDUUT THAS A SHUTTER PROBED OF 1.5 MILLISECONDS AND THO OF 62.5 KHZ, THE 500 LINE FRAME IS PROCESSED TO THE TARGET HAGET HAGET HAGE STELLITE'S SPIN MATICALLY TRIGGERED SO AS TO BE IN A PICTURE TWEND DIRECTED TOWARD THE BARTH, TRANSMISSION THEN DIRECTED TOWARD THE BARTH, TRANSMISSION TO 32 PICTURES CAN BE ACCOMPLISHED IN 100 TALLING TO 32 PICTURE AND THE BARTH, TRANSMISSION THEN TRANSMITTER OPERATING AT A NOMINAL FRE- TALLING TO THE TARGET THAND THE TARNSMISSION THEN DIRECTED TOWARD THE BARTH, TRANSMISSION TO 32 PICTURES CAN BE ACCOMPLISHED IN 100 TO 32 PICTURES CAN BE ACCOMPLISHED IN 100  | ECTRONICS PRINCETON, NEW JERSEY 06/62 NA  |
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| E PICTURES OF EARTH'S CLOUD COVER AND INVESTI- AGES OF HURRICANES AND ATMOSPHERIC MOTIONS, *** IRM THE CAPABILITY OF USING A WEATHER SATELLITE ANCE.  YIDICON CAMERA SYSTEM WAS ALSO FLOWN, IN IDEN- DW, ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH A POCAL-PLANE SHUTTER THAT PERHITS STORAGE OF THE TUBE SCREER, AN BLECTRON BEAM CONVERTS THE NTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH NTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURE OF MADIUM ANGLE AND STORE UP TO 32 PICTURE OF THE STORY OF A 15 MILLISECONDS AND OF 62.5 KHZ, THE 500 LINE PRANE IS PROCESSED SECS. A MINIMUM INTERVAL, BETWEEN PICTURES HER DIRECTED TOWARD THE EARTH, TRANSMISSION L OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 IT PM TRANSMITTER OPERATING AT A NOMINAL PRE-  | DE PICTURES OF EARTH'S CLOUD COVER AND INVESTI- STAGES OF HURRICANES AND ATMOSPHERIC MOTIONS. *** FIRM THE CAPABILITY OF USING A WEATHER SATELLITE SSANCE.  LE VIDICON CAMERA SYSTEM HAS ALSO FLOWN, IN IDEN- ILON, ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH FIND TO GROUND RECEIVER ON MAGNETIC TAPE I AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE SEA P/18 LENS PRODUCING A RESOLUTION OF ABOUT SEA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND I'M OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED I'M ANTICALLY TRIGGERED SO AS TO BE IN A PICTURE I'M ANTICALLY TRIGGERED SO AS TO BE IN A PICTURE I'M ANTICALLY TRIGGERED SO AS TO BE IN A PICTURE I'M ANTICALLY TRIGGERED SO AS TO BE IN A NOMINAL FRE- I'M ANTICALLY TRIGGERED SO AS TO BE IN A NOMINAL FRE- I'M ANTICALLY TRIGGERED I'M ANTICALLY TRANSMISSION TRIGGERED I'M ANTICALLY TRANSMISSION TRIGGERED I'M ANTICALLY TRANSMISSION TRIGGERED I'M ANTICALLY TRANSMI | 29. SPACECRAFT  |
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| AGES OF HURRICANES AND ATMOSPHERIC MOTIONS, *** IRM THE CAPABILITY OF USING A WEATHER SATELITE ANCE.  WIDTON CAHERA SYSTEM WAS ALSO FLOWN, IN IDEM- DW, ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH A POCAL-PLANE SHUTTER THAT PERMITS STORAGE OF THE TUBE SCREEW. AN BLECTRON BEAM CONVERTS THE NTO TELEVISION—TYPE ELECTRONIS SIGNALS, WHICH ND TO GROUND FECEIVERS ON COMMAND. THE SYSTEM AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE THE THE CAMERA HAS A MEDIUM ANGLE A LATER THE THE CAMERA HAS A MEDIUM ANGLE A LATER THE TENS PRODUCING A RESOLUTION OF ABOUT A RS A SHUTTER SPEED OF 1.5 MILLISECONDS AND OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED SECS. A MINIMUM INTERVAL, BETWEEN PICTURE, HEN DIRECTED TOWARD THE RARTH. TRANSMISSION L OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 IT PM TRANSMITTER OPERATING AT A NOMINAL FRE-   | STAGES OF HURRICANES AND ATMOSPHERIC MOTIONS, *** STANCE.  SANCE.  LE VIDICON CAMERA SYSTEM HAS ALSO FLOWN, IN IDEN- ILON, ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH DA POCAL-PLANE SHUTTER THAT PERMITS STORAGE OF INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH PED TO GROUND RECRIVERS ON COMMAND. THE SYSTEM S AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE TATA LATER TIME, THE CAMERA HAS A MEDIUM ANGLE RAD STORE UP TO 32 PICTURES ON MAGNETIC TAPE SER P/18 LENS PRODUCING A RESOLUTION OF ABOUT RAD AS SHUTTER SPEED OF 1.5 MILLISECONDS AND CH OF 62.5 KHZ, THE 500 LINE FRAME IS PROCESSED CHOR OF THE TRAGET LINAGE TO BE ELECTRICALLY RAD IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN MATICALLY TRIGGERED SO AS TO BE IN A PICTURE TWEND DIRECTED TOWARD THE EMETH, TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100  AATT PM TRANSMITTER OPERATING AT A NOMINAL FRE-   | -TO PROVIDE PICTURES OF EARTH'S CLOUD COVER AND INVESTI-  |
| WINCE.  WIDICON CARERA SYSTEM WAS ALSO FLOWN, IN IDEN- NW. ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH A POCAL-PLANE SHUTTER THAT PERHITS STORAGE OF THE TUBE SCREEN. AN BIECTRON BEAM CONVERTS THE WIO TELEVISION-TYPE ELECTRON SEAM CONVERTS THE NTO TELEVISION-TYPE ELECTRON SEAM CONVERTS THE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE A P/18 LENS PRODUCING A RESOLUTION OF ABOUT A P/18 LENS PRODUCING A RESOLUTION OF ABOUT OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED SECS. A MINIMUM INTERVAL, BETWEEN PICTURES, OF HEN DIRECTED TOWARD THE EARTH, TRANSMISSION L OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 IT PM TRANSMITTER OPERATING AT A NOMINAL FRE- FIRE EARTH'S SURFACE   | SSANCE.  E VIDICON CAMERA SYSTEM WAS ALSO FLOWN, IN IDEN- ION, ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH ION, ON TIROS 4 AND 6. IT CONSISTS OF A 1/2-INCH IN THE TUBE SCREEN. AN ELECTRON BEAM CONVERTS THE IN THE TUBE SCREEN. AN ELECTRON ELEN CONVERTS THE FED TO GROUD MORCELYERS ON COMMAND. THE SYSTEM I AT A LATER TIRE. THE CAMERA HAS A MEDIUM ANGLE IRA PA'-18 LENS PRODUCING A RESOLUTION OF ABOUT IRA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND IN OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED IN OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED IN OF 62.5 KHZ. THE SAUTHER DESTRICTLY INTERVALE TO BE ELECTRICALLY INTERVALE TO BE IN A PICTURE IN WHEN DIRECTED TOWARD THE ERRTH. TRANSMISSION INTERVALE OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 INTERVALED IN TRANSMISTICAL INTERVALE THE BRATH. TRANSMISSION INTERVALED OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 INTERVALED OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 INTERVALED OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 INTERVALED OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 INTERVALED OF 32 PICTURE OPERATING AT A NOMINAL FRE- ION  | AND ATMOSPHERIC MOTIONS, ***  |
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| A POCAL-PLANE SHOTTER FRANCE OF THE TUBE SCREEN. AN BLECTRON BEAM CONVERS THE TUBE SCREEN. AN BLECTRON BEAM CONVERS THE NTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH OF GROUND RECRIVERS ON COMMAND. THE SYSTEM AND STORE UP TO 32 PICTURES ON HAGNETIC TAPE AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE AND A HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND OP 62.5 KHZ. THE 500 LINE FRANE IS PROCESSED OF 62.5 KHZ. THE 500 LINE FRANE IS PROCESSED OF 62.5 A MINHAUM INTERVAL, BETWEEN PICTURES, OF SIRED FOR THE TARGET TO THE SATELLITE'S SPIN ATICALLY TRIGGERED SO AS TO BE IN A PICTURE HEND DIRECTED TOWARD THE BARTH. TRANSMISSION IT PM TRANSHITTER OPERATING AT A NOMINAL FRE-FIRE PARTH.   | A FULL PLANE SHOTTER THAT FERRING STORMED OF THE TUBE SCREEK. AN BLECTRON BEAM CONVERTS THE INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH TED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM SAND STORE UP TO 32 PICTURES ON RAGNETIC TAPE I AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE RAA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND HY OF 62.5 KHZ. THE SOO LINE FRANE IS PROCESSED IN SEC. A MINIMUM INTERVAL, BETWEN PICTURES, OF QUIRED FOR THE TARGET INAGE TO BE ELECTRICALLY RAA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN OMATICALLY TRIGGERED SO AS TO BE IN A PICTURE WHEN DIRECTED TOWARD THE BARTH. TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 AATT PM TRANSMITTER OPERATING AT A NOMINAL PRE-   |   |
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| A PARAMETER SPEED OF 1.5 MILLISECONDS AND OF 62.5 KHZ. THE SOUL LINE FRAME IS PROCESSED OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED IN THE TARGET LINE TO THE SATELLITE'S SPINATICALLY TRIGGERED SO AS TO BE IN A PICTURE HERD DIRECTED TOWARD THE EARTH, TRANSMISSION LOP 32 PICTURES CAN BE ACCOMPLISHED IN 100 FT PM TRANSMITTER OPERATING AT A NOMINAL FREME PM TRANSMITTER OPERATING AT A NOMINAL FREME PM TRANSMISTER OPERATING AT A NOMINAL FREME PM TRANSMISTER OPERATING AT A NOMINAL FREMENT.   | THE FART THE TOTAL THE STATE OF THE STATE OF THE STATE OF THE STATE STAT | ALSO PROCESS  |
| A HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND 62.5 KHZ. THE 500 LINE FRAME IS PROCESSES SECS. A MINIMUM INTERVAL, BETWEEN PICTURES, JIRED FOR THE TRAGET LINE TO BE ELECTRICALLY STEALY TRIGGERED SO AS TO BE IN A PICTURE HERD DIRECTED TOWARD THE EARTH, TRANSMISSION LOF 32 PICTURES CAN BE ACCOMPLISHED IN 100 PT PM TRANSMITTER OPERATING AT A NOMINAL FRE-   | RA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSEIN OF SECS. A MINIMUM INTERVAL, BETWEEN PICTURES, QUIRED FOR THE TARGET IHAGE TO BE ELECTRICALLY OF A LIGNED PARALLEL TO THE SATELLITE'S SPINMATICALLY TRIGGERED SO AS TO BE IN A PICTURE OF WHEN DIRECTED TOWARD THE EARTH, TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 ATT PM TRANSHITTER OPERATING AT A NOMINAL PRESENT.   | DEGREES) TEGE   |
| OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED OF 62.5 KHZ. THE SOU LINE FRAME IS PROCESSED SECS. A MINIMUM INTERVAL, BETWEEN PICTURES, IRBD FOR THE TARGET INAGE TO BE ELECTRICALLY A IS ALIGNED PARALLEL TO THE SATELITE'S SPINATICALLY TRIGGERED SO AS TO BE IN A PICTURE ARR DIRECTED TOWARD THE EARTH, TRANSMISSION IN THE TRANSMITTER OPERATING AT A NOMINAL FRE-  | NH OF 62.5 KHZ, THE SUO LINE FRAME IS PROCESSED OF 2 SECS. A MINIMUM INTERVAL, BETWEEN PICTURES, 2QUIRED FOR THE TARGET IMAGE TO BE ELECTRICALLY PRAICALLY TRIGGERED SO AS TO BE IN A PICTURE IN HEN DIRECTED TOWARD THE EARTH, TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 TATT FM TRANSMITTER OPERATING AT A NOMINAL PRESENTING AT A NOMINAL PRESENTAL  | NM. THE CAMBRA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND  |
| TREE FOR THE TARGET INAGE TO BE ELECTRICALLY A IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN ATICALLY TRIGGRED SO AS TO BE IN A PICTURE ARRH DIRECTED TOWARD THE EARTH. TRANSMISSION L OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 FIT PM TRANSMITTER OPERATING AT A NOMINAL FRE-  | COURDED FOR THE TARGET LINAGE TO BE ELECTRICALLY RA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN MATICALLY TRIGGERED SO AS TO BE IN A PICTURE T WHEN DIRECTED TOWARD THE EARTH, TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 AATT PM TRANSMITTER OPENATING AT A NOMINAL PRE-  | DECOMPANDING OF 62.5 KHZ. THE DOUBLINE FRAME IS PROCESSED   |
| ERASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELITE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PICTURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMISSION OF THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SECONDS BY A 2-WATT PM TRANSMITTER OPERATING AT A NOMINAL PRE- QUENCY OF 235 MHZ.  22 PHENOMENA OBSERVED CLOUD COVER OVER THE BARTH'S SURPACE 33 MEASUREMENT RANGE T TO 8 LEVELS OF GRAY   | ERASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN<br>AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PICTURE<br>TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH. TRANSMISSION<br>OF THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100<br>SECONDS BY A 2-MATT PM TRANSMITTER OPERATING AT A NOMINAL PRE-<br>QUENCY OF 235 MRZ.  | SECONDS IS REQUIRED FOR THE TARGET INFACE TO  |
| ATICALLY TRIGGRRD SO AS TO BE IN A PICTURE DESCRIPTION OF THE SALTH. TRANSMISSIT PM TRANSMISSIT PM TRANSMITTER OPERATING AT A NOMINAL.  FIRE RARTH'S SURFACE   | MATICALLY TRIGGRRED SO AS TO BE IN A PICTU I WHEN DIRECTED TOWARD THE EARTH. TRANSHISS SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN I AATT PR TRANSHITTER OPERATING AT A NOMINAL 12.  | ED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN  |
| THE PARTH'S SURFACE  THE BARTH'S SURFACE   | I WHEN DIRECTED LOWREN INE ERRIES TRANSILSONS SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN I AATT PR TRANSHITTER OPERATING AT A NOMINAL IZ.   | S AND IS AUTOMATICALLY TRICGERED SO AS TO BE IN A PICTURE   |
| IT PR TRANSHITTER OPERATING AT A NOMINAL.  FRE BARTH'S SURPACE  SRAY   | AATT PR TRANSHITTER OPERATI'NG AT A NOMINAL<br>12.   | ING MODE ONLY WHEN DIRECTED FORMED THE EARTH, TRANSHISSION<br>THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100   |
| QUENCY OF 235 MRZ.  32 PHENOMENA OBSERVED  CLOUD COVER OVER THE BARTH'S SURFACE  33. MEASUREMENT RANGE  7 TO 8 LEVELS OF GRAY  | QUENCY OF 235 MRZ.   | A NOMINAL   |
| 32. PHENOMENA OBSERVED  CLOUD COYER OYER THE BARTH'S SURFACE 33. MEASUREMENT RANGE 7 TO 8 LEVELS OF GRAY   |  | 235   |
| CLOUD COVER OVER THE BARTH'S SURPACE 35. MEASUREMENT HANGE 7 TO 8 LEVELS OF GRAY   | 32. PHENOMENA OBSERVED   | ENOMENA DBSERVED  |
| 7 TO 8 LEVELS OF GRAY  | CLOUD COVER OVER THE BARTH'S SURFACE   | ID COYER OVER THE BARTH'S SURFACE   |
| / IU 8 LEVELS OF SAAI  | 3. Meadulerin Hande  | ADVIEW I AND CONTROL OF THE CONTROL |
| 34 PRECISION AND ACCURACY  | 7 TO B LEVELS OF GRAI  | 7.8 LEVELS OF GRAY  |

|                          | 35. SPECTRAL RANGE   |
|--------------------------|--|
| 38 5151 0.5              |  |
| 56.0                     | BY 56.0 DEG 480 NM BY 480 NM PROM 450 NM ALTITUDE  |
| 40.ANGULAR RES           | SOLUTION AT TIME BROWN AS A ME STREET  |
| 42, POINTING ACCURACY    | 43. POINTING RATE  |
|                          | MED CIRCULAR MEDIUM POSIGRADE  |
| 46. SPECIAL REGUIREMENTS | COUNTENENTS  |
| 47. COMPONENTS           | 1 [  |
| TV CAMERA                | TRANSMITTER, TAPE RECORDER   |
|                          | S NON CAPTER 6   |
| 54. INTERFEREN           | 155. INTERFERENCE S6. INTERFERENCE 57. INTERFERENCE 58. SHIELDING  |
| 59. CALIBRATION          | SENSITIVE   MAGNETIC SHIELDING USED ON STREAM STATE SHIELDING USED ON STREAM STATE SHIELDING USED ON STREAM SHIP USED ON STREAM SHIELDING USED ON STREAM SHIP USED ON STREAM SHI |
| NO IN-PLIGHT             | RATION DELAYED OR REALTIME   |
| FULL REEL                | PULL FREE OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING AN PROPAGATORY OF 235 MHZ  |
|                          |  |
| DDO NO CO                | 63. ADVANTAGES AND LIMITATIONS DEPOTE CAMPAGES AND LIMITATIONS DEPOTE CAMPAGENC VAITABLE FOR   |
| EST                      | AND ICE RECONNISSANCE.   |
| 2                        |  |
| 1) SIGNI<br>NASA SP-     | IEVEMENTS IN SATELLITE METEOROLOGY, 1958-1<br>NSTRUMENTS AND SPACECRAFT, OCT 57-MAR 65.  |
| 5P-3028.                 | AVAILARLE PROM NATI  |
| RECORDS                  | SA) ASHEVILLE, N.C.  |
| 65, HISTORICAL REMARKS   | I. REMARKS   |
| IDENTICAL                | L INSTRUMENTS FLOWN ON TIROS 4, 5, AND 6,  |
|                          |  |
|                          |  |
|                          |  |
| ***                      |  |
| - 1981                   |  |
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| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 13. SPECTRAL RANGE 10.5 TO 0.65 MICRONS NA 13. FIELD OF VIEW 13. GROUND SWATH 14.0 BY 74.0 DEG 740 NR BY 740 NR ALTITODE |
|--|--|
| 1. TITLE 2. ACRONYM 3. EXP NO  | RESOLUTION 41, SPATIAL RESOLUTION  |
|  | LINE PROM 450 NM A   |
| 4, HESUME<br>DATE  | TITUDE 45. INCLINATION   |
| WIDE-ANGLE LENS  | AR SORCIAL DECULEMENTS   |
| B. 1 GODDARD SPACE PLT CENTER  |  |
| 10. ORGANIZATION   | 1 1  |
|  | SRA, TRANSMITTER, TAPE RECORDER  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLAGH INDEX NUMBER 15. DATE 16. CONTRACT NUMBER 15. DATE 16. CONTRACT NUMBER 15. DATE   | T 49, VOLUME 50, AVERAGE POWER 51, STANDBY POWER 52, PEAK  |
| POST FLIGHT  | F AF SE MAGNETIC SE NUCLEAR ST THERMAL TO SHIELDING  |
| San Co   | CENTERFERENCE CENTERFERENCE  |
| ,,   | 60. DATA RECOVERY  |
| SCTRONICS PRINCETON, NEW JERSEY 06/62 NA   | NO IN-FLIGHT CALIBRATION DELAYED AND REALTIME DAYSIDE OF ORBIT   |
| LVPE   |  |
| IMAGER, 0.5-INCHEMIDE-ANGLE P/1.5 LOW-RESOLUTION VIDICON UNC   | PULL REEL OF 32 PICTURES CAN BE REAU OUT IN 100 SECONDS USING AN TRANSMITTED OPPRATING AT PRECIENCY OF 235 MHZ.          |
|  |  |
| POSE   | 63. ADVANTAGES AND LIMITATIONS   |
| -TO ACQUIRE AND TRANSMIT PICTU   |  |
|  | DATA FOR WEATHER ANALYSIS THAN PROM MED OF NARROW ANGLE CAMERAS  |
| INDIVIDUAL CLOUD TYPES OVER SPECIFIC AREAS, *** SECONDARY-TO TEST  | 64. REFERENCES   |
| TV SENSOR IN SPACE.  | DESCRIPTION ACRESCENT IN SALUE (930-1904, MASA SE 30-111   |
|  | NAUTICS, V.5, JUNE 1960.***3) MESNER, M.H. AND STANISZEWSKI, J.:   |
| 31. PRINCIPLES OF OPERATION  | TV CAMERAS FOR SPACE EXPLOR. ASTRONAUTICS, V.S. MAY 1960. ***  |
| THIS CAMERA SUB-SYSTEM HAS FLOWN IN AN IDENTICAL CONFIGURATION   | 4) INSTRUMENTS AND SPACECRAFT. NASA SP-3028, 1966. ***5) DATA  |
| ON TIROS 1-10 AND SIMILAR CONFIGURATION ON ESSA 1. ON TIROS 1-8,   | AVAILABLE FROM NATIONAL WEATHER RECORDS CTR (ESSA), ASHEVILLE, NC.   |
| THE STATE CAREANS WERE ALIGNED PARALLE TO THE STORY AND THE STATE AND TH | 155. HS UNICAL REMARKS   |
| EXTENDED THROUGHTHE BASE PLAIR. IT CONSISTS OF A 1/2-IN VIDICON THRE AND A POCALEDIANE SHITTER THAT DERMITS STORAGE OF STILL   | CAREKA FLOWN ON ITHOS IT IO. STALLAR CARERA OR ESSA  |
| ON THE TUBE SCREEN AN FLECT  |  |
| PICTORES INTO TREETING THE PROPERTY OF THE PRO |  |
| TRANSMITTED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM CAN ALSO  |  |
| PROCESS AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE POR TRANS-  |  |
| MISSION AT A LATER TIME. THE CAMERA HAS A WIDE ANGLE (105 DEG)   |  |
| ELGEET'S FILS DENS PRODUCING A NESCHOLLON OF 1.4 TO 2.0 NOT 1.1 TO |  |
| OF 62 5 KHZ. THE SOOTIER SPEED OF 1.3 STEEDS AND A TIDEO BANDALUIN   |  |
| IN INTERVAL OF 10 SEC BETWEEN PICTURE  |  |
| FOR THE TARGET INAGE TO BE SLECTRICALLY ERASED. THE CAMERA IS A-   |  |
| IN AXIS  |  |
| TAKING MODE ONLY WHEN  |  |
| IN OF THE ENTIRE   | ,  |
| PICTURES CAN BE ACCOMPLISHED IN 100 SEC BY A 2-WATT PH TRANS-  |  |
| 5  |  |
| CLOUD COVER AND THE EARTH'S SURPACE  |  |
| 33. MEASUREMENT RANGE  |  |
| 7 TO 8 LEVELS OF GRAY  |  |
| 34. PRECISION AND ACCUPACY   |  |
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|  |  |

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| CACHONYM   3 EXPON   2 EXPON   2 EXPON   2 EXPON   2 EXPON   2 EXPON   3 EXPON   4 E   | INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER                                     | 36. SPECTRAL RANGE 36. SPECTRAL RESOLUTION 37. TIME CONSTANT 0.5 TO 0.65 MICRONS NA 38. FIELD OF VIEW 38. FIELD OF VIEW |
|--|---|---|
| CODDARD SEACE PLT CENTER   10.000   1.000      | CAMBRIDGE, MASSACHUSETTS  | NM BY 450 NM PROM 400 NM  |
| S CONCOURTER OF BALLEL TO THE STREET HE STREET | MATAYA COMEAN NOTICE AND  |   |
| S.   COMPONENTION   STATES   S | 4 RESUME  | 43. POINTING RATE 44. ALTITUDE  |
| CORDANDA DE SALE PLI CENTER   11-150-150-17   CONTINUED   CONTIN   | S   | NED CIRCULAR MEDIUM   |
| THOUSEN THE STATE ALL STATES ALL  | 7. ORGANIZATION   | 46. SPECIAL REQUIREMENTS  |
| TYMORE PROTECTIONS OF RATER AND STATES AND S | (MGR.) GODDARD SPACE FLT CENTER 10. ORGANIZATION  | 47. COMPONENTS  |
| In A case   In a   |   | RA, TRANSMITTER, TAPE RECORDER  |
| NACHOUSE   PARA HEADTRS   PARA HEA   | 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 16. CONTRACT  | BY POWER 52. PEAK POWER   |
| INSTALLABOTES OSSA/SED 100-100-100-100-100-100-100-100-100-100   | 19. AGENCY 20. PGM OFFICE 21. TELEPHO   | 58. SHIELDING   |
| CHENTURA-NGIG PATAGETON, NEW JERSEY OS-COAL NA DELACTION DELACED REALTINE DE PLOCATION DELACED REALTINE DE PLANS THE CAPABILITY OF USING A WEATHER SATELLITE BROOD STANDFILL TERRITER THREE THRE | . M.L. NASA HDOTRS OSSA/SRO   | MAGNE   |
| THE EARTH'S SUBERT OF THE STATE OF THE PROPERTY OF STATE  | 23 LOCATION 23 LOCATION ADD TENTON AND TENCED   | 60. DATA RECOVERY   |
| THEDIUM-ANGLE F/1.8 VIDICON  TIROS 6  TIROS 10  TRESS OF BURRICANES AND INVESTI- TRAGES OF BURRICANES AND ATMOSPHERIC MOTIONS.***  IPPIRM THE CAPABILITY OF USING A WEATHER SATELLITE SANCE.  B. VIDICON CAMERA SYSTEM MAS ALSO PLOWN, IN IDEN- TION, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH INTO TELEVISON-THEE THAT PERMITS STORAGE OF INTO TELEVISON-THEE THAT PERMITS STORAGE OF INTO TELEVISON-THE ELECTRONIC SIGNALS, WHICH TED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM TATA LARER TIRE. THE CAMERA HAS A MEDIUM ANGLE TEA F/1.8 LENS PRODUCING A RESOLUTION OF ABOUT THAT A LARER TIRE. THE CAMERA HAS A MEDIUM ANGLE THAT A LARER TIRE. THE CAMERA HAS A MEDIUM ANGLE THAT A LARER TIRE. THE SPEED OF 1.5 MILLISECONDS AND H OF 62.5 KHZ. THE SOLINE PRAME IS PROCESSED COURRED POR THE TARGET IMAGE TO BE ELECTRICALLY TRIGGERED SO AS TO BE IN A PICTURE'S THAT PALE EARTH. TRANSHISSION THE OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 THE CALLY TRIGGERED SO AS TO BE IN A PICTURE THE EARTH'S SUBRACE TO THE TRANSMITTER OPERATING AT A NOMINAL PRE- TO STATE  THE EARTH'S SUBRACE   | SCINCAICS FRINCEION, NEW JEASEI 102/02 NA   | NO ANTELLAND SALLDMAILON DELATED ON NEALTING LUAY SING OF ORBIT   |
| DE PICTURES OF EARTH'S CLOUD COVER AND INVESTI- TAGES OF HURRICANES AND ATHOSPHERIC HOTIONS.*** FPIRM THE CAPABILITY OF USING A WEATHER SATELLITE SSANCE.  LON, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH ION, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH ED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM I AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE I AT A LATER TIME, THE CAMERA HAS A MEDIUM ANGLE IRA PLAIS BLOOD RECEIVERS ON COMMAND. THE SYSTEM I AT A LATER TIME, THE CAMERA HAS A MEDIUM ANGLE IRA PLAIS BLOOD RECEIVERS ON COMMAND. THE SYSTEM I AT A LATER TIME, THE CAMERA HAS A MEDIUM ANGLE IRA PLAIS BLOOD RECEIVERS ON COMMAND. THE SYSTEM I AT A LATER TIME, THE CAMERA HAS A MEDIUM ANGLE IRA PLAIS BLOOD RECEIVERS ON SHOUTHOUR AS STORE OF 1.5 MILLISECONDS AND HOF 62.5 KHZ. THE SOO LINE PRAME IS PROCESSED I SECOND SECOND SOURCESSED IN MEND DRECTED TOWARD THE EARTH. TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 ATT PH TRANSMITTER OPERATING AT A NOBINAL PRE- IZ.  "GRAY.  "GRAY.   | VIDICON<br>29, SPACECRAFT   | IN 100 SECONDS  |
| DE PICTURES OF EARTH'S CLOUD COVER AND INVESTI- TAGES OF HURRICANES AND ATMOSPHERIC MOTIONS.*** FIRM THE CAPABILITY OF USING A WEATHER SATELLITE SANCE.  LONG CALL-PLANE SHUTTER THAT PERMITS STORAGE OF NA THE THES SHORES OF AND 5. IT CONSISTS OF A 1/2-INCH INTO TELEVISION-TIPE ELECTRONIC SIGNALS, WHICH INTO TELEVISION-TIPE ELECTRONIC SIGNALS, WHICH ED TO GROUND RECEIVERS ON MAGNETIC TAPE INTO TELEVISION-TIPE ELECTRONIC SIGNALS, WHICH ED TO GROUND RECEIVERS ON MAGNETIC TAPE INTO TELEVISION-TIPE ELECTRONIC SIGNALS, WHICH ED TO GROUND RECEIVERS ON MAGNETIC TAPE INTO TELEVISION-TIPE SPEED OF 1.5 MILLISECONDS AND HOP 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED INTO GROUND AND INTERVAL, BETWEEN PICTURES, OF COURTED PARLILLE TO THE STELITE'S SPIN HARN DIRECTED TOKARD THE EARTH. TRANSMISSION MATICALLY TRIGGERED SO AS TO BE IN A PICTURE INTERVAL OF AND THE EARTH. TRANSMISSION RATT PA TRANSMITTER OPERATING AT A NOBINAL PRE- IZ.  "GRAY  "GRAY   |   |   |
| PIRGES OF HURRICANES AND AIMOSPHERIC MOTIONS.***  PIRM THE CAPABILITY OF USING A WEATHER SATELLITE  SANCE.  LON  TON  TON  TON  TON  TON  TON  TON   | -TO PROVIDE PICTURES OF BARTHS  | NG OF CLOUD COVER PATTERNS, VALUABLE  |
| SANCE.  SANCE.  IN THE CAPABILITY OF USING A WEATHER SATELLITE  SANCE.  IN VIDICON CAMERA SYSTEM WAS ALSO FLOWN, IN IDEN- ION, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH INTO TELEVISION-TYPE ELECTRON BEAM CONVERTS THE INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH ED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE I AT A LITER TIRE. THE CAMERA HAS A MEDIUM ANGLE IEA F/1.8 LENS PRODUCING A RESOLUTION OF ABOUT H OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED H OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED H OF 62.5 KHZ. THE SOLINE PRAME IS PROCESSED FOURDED POR THE TARGET IMAGE TO BE ELCTRICALLY SRA IS ALIGHED DARALLEL TO THE SATELLITE'S SPIN HARN DIRECTED TOWARD THE EARTH. TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100  ATT PH TRANSMITTER OPERATING AT A NOMINAL PRE- IZ.  "GRAY"   | GATE PORKATIVE STAGES OF HURRICANES AND ATMOSPHERIC MOTIONS. * **   | AND ICE RECONNAISSANCE.   |
| LE VIDICON CAMERA SYSTEM MAS ALSO PLOWN, IN IDEN- IDN, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH IND TEROS 4 AND 5. IT CONSISTS OF A 1/2-INCH INTO TELEVISOR SHEET THAT PERMITS STORAGE OF INTO TELEVISOR. AN ELECTRON BEAM CONVERTS THE INTO TELEVISOR. TYPE ELECTRON SIGNALS, WHICH ED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE I AT A LATER TIRE. THE CAMERA HAS A MEDIUM ANGLE ED A STORE UP TO 32 PICTURES ON MAGNETIC TAPE I AT A LATER TIRE. THE CAMERA HAS A MEDIUM ANGLE ED A STORE UP TO 32 PICTURES ON PROPULING A RESOLUTION OF ABOUT H OF 62.5 KHZ. THE SOULING A RESOLUTION OF ABOUT H OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED COURRED POR THE TARGET HAGE TO BE ELECTRICALLY SRA IS ALIGHED PARALLEL TO THE SATELLITE'S SPIN MATH DIRECTED TOWARD THE EARTH. TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 ATT PH TRANSMITTER OPERATING AT A NOMINAL PRE- IZ.  "GRAY"  | CAPABILITY  | 1) STG. ACHTEV IN SAT MET 1059-1064 NASA SD-06 *** 2) TNSTEINENES   |
| LE VIDICON CAMERA SYSTEM WAS ALSO FLOWN, IN IDEN- ION, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH ION, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH NA FOCAL-PLANE SHUTTER THAT PERMITS STORAGE OF INTO TYPE WISTERS AND ELECTRON BEAM CONVERTS THE INTO TYPE WISTERS ON COMMAND. THE SISTEM AND STORE UP TO 32 PICTURES ON MCGNETIC TAPE I AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE IEA FOR STORE UP TO 32 PICTURES ON MCGNETIC TAPE I AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE IEA FOR STORE UP TO 32 PICTURES ON PROPURE IEA PLAS ROBOUTING A RESOLUTION OF ABOUT HOP 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED I SECS. A MINIMUM INTERVAL, BETWEEN IS PROCESSED I SECS. A MINIMUM INTERVAL, BETWEEN IN PICTURE WHEN DIRECTED TOWARD THE RATHLITE'S SPIN MATICALLY TRIGGERED SO AS TO BE IN A PICTURE I WEND DIRECTED TOWARD THE RATHLITE'S SPIN SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 I THE EARTH'S SURFACE I THE EARTH'S SURFACE  |   | AND SPACECRAFT OCT 57-MAR 65. NASA SP-3028.***3) NASA NEWS RE-  |
| LE VIDICON CAMERA SYSTEM WAS ALSO FLOWN, IN IDEN- ION, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH DA FOCAL-PLANE SHOTTER THAT PERMITS STORAGE OF NUT THE TUBE SCREEN.AN ELECTRON BEAM CONVERTS THE INTO TELEVISION-TYPE ELECTRON BEAM CONVERTS THE INTO TELEVISION-TYPE ELECTRON BEAM CONVERTS THE INTO TO GROUND RECEIVERS ON COMMAND. THE SYSTEM AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE I AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE BEA 71.8 LENS PRODUCING A RESOLUTION OF ABOUT MERRA 14.5 A SHUTTER SPEED OF 1.5 MILLISECONDS H OF 62.5 KHZ. THE SOU LINE PRAME IS PROCESSED H OF 62.5 KHZ. THE SOU LINE PRAME IS PROCESSED H OF 62.5 KHZ. THE SOU LINE PRAME IS PROCESSED H OF 62.5 KHZ. THE SOU LINE PRAME IS PROCESSED H OF 62.5 KHZ. THE SOU LINE PRAME IS PROCESSED H OF 62.5 KHZ. THE SOU LINE PRAME IS PROCESSED IN THE PRANCHISTICALLY RAID DIRECTED TOWARD THE BATTH. TRANSHISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 ATT PH TRANSHITTER OPERATING AT A NOBINAL PRE- IZ. FREE EARTH'S SURFACE   | 31. PRINCIPLES OF OPERATION   | LEASES FOR TIROS 4,5,6. RELEASE NO'S. 62-24;62-136;62-194.***   |
| SECRETE AND 5. IT CONSISTS OF A 1/2-INCH SECRETE AND STUTTER THAT PERHITS STORAGE OF INTO FELVISION-TYPE ELECTRON BEAM CONVERTS THE BY THE TUBE SCREEN.AM ELECTRON BEAM CONVERTS THE INTO FELVISION-TYPE ELECTRON EACH CONVERTS THE BY THE TUBE SCREEN.AM ELECTRON EACH CONTRAND. INTO FELVISION-TYPE SERVISION INTO FELVISION-TYPE SURFACE INTO FELVISION-TYPE SERVISION INTO FELVISION-TYPE SURFACE INTO FELVISION-TYPE SERVISION INTO FELVISION-TYPE SERVISION-TYPE SERVISION INTO FELVISION-TYPE SERVISION-TYPE SERVISI | THIS MEDIUM ANGLE VIDICON CAMERA SYSTEM WAS ALSO PLOWN, IN IDEN-  | ASHEVILLE, N.C.   |
| NATIONALLY THAT FOR THE STATEM THAT FOR | TICAL CONFIGURATION, ON TIROS 4 AND 5. IT CONSISTS OF A 1/2-INCH  | se uictobital perabuc   |
| INTO TENENSISTANCE.  INTO TENENSISTANCE.  INTO GROUND RECEIVERS ON COMMAND. THE SYSTEM  INTO GROUND RECEIVERS ON NAGNETIC TARE  INTO GROUND RECEIVERS ON NAGNETIC TARE  INTO GROUND RECEIVERS ON NAGNETIC TARE  INTO THE LENS PRODUCING A RESOLUTION OF ABOUT  INTO HAS A SHITTER SPEED OF 1.5 MILLISECONDS AND  HAS A SHITTER SPEED OF 1.5 MILLISECONDS AND  HOP 62.5 KNZ. THE 500 LINE FRAME IS PROCESSED  HOP 62.5 KNZ. THE SOLUTION OF ABOUT  RAIS A SHITTER SPEED OF 1.5 MILLISECONDS  RAIS A SHITTER SPEED OF 1.5 MILLISECONDS  RAIS A SHITTER SPEED OF 1.5 MILLISECONDS  RAIS A SHITTER STELLITE'S SPIN  MARIOLISECTED TOWARD THE BARTH. TRANSHISSION  RECOMPLISHED IN 100  ATT PH TRANSHITTER OPERATING AT A NOWINAL PRE-  | CHILL OF THE AND A FOCAL-PLANE SHUTTER THAT PERMITS STORAGE OF  | CARE D 1 20010 NO MICHG SEMENT  |
| TED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE I AT A LATER TIME. THE CAMERA HAS A MEDIUM ANGLE EA F/1.8 LENS PRODUCING A RESOLUTION OF ABOUT MERA HAS A SHUTTER SPEED OF 1.5 MILLISECONDS AND H OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED 2 SECS. A MINIMUM INTERVAL, BETWEN PICTURES, OF QUIRED POR THE TARGET IMAGE TO BE ELECTRICALLY RA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN MATICALLY TRIGGERED SO AS TO BE IN A PICTURE I WHEN DIRECTED TOWARD THE EARTH. TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 ATT PH TRANSMITTER OPERATING AT A NOWINAL PRE- IZ.  "GRAY"  | STILL FICTORES ON THE TOBE SCREEN, AN ELECTRON BEAR CONVERTS THE STORED PICTORES INTO TELEVISION-TYPE ELECTRONIC SIGNALS, WHICH | L INSTRUCTION IN TIRUS 4 5 AND  |
| AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE I AT A LATER TIRE. THE CAKERA HAS A MEDIUM ANGLE EBA F/1.8 LENS PRODUCING A RESOLUTION OF ABOUT HAS A SHUTTER SPRED OF 1.5 MILLISECONDS AND H OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED I SECS. A MINIMUM INTERVAL, BETREEN PICTURES, OF QUIRED FOR THE TARGET IMAGE TO BE CTRICALLY RA IS ALIONED PARALLEL TO THE SATELLITE'S SPIN MADIO DIRECTED TOWARD THE EARTH. TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 ATT PH TRANSMITTER OPERATING AT A NOMINAL PRE- IZ.  F. THE EARTH'S SURFACE.  | CAN BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM   |   |
| THE EARTH'S SURFACE  THE PATE THE STATE THE ST | PICTURES  |   |
| H OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED 12 SECS. A MINIMUM INTERVAL, BETWEN PICTURES, OP 12 SECS. A MINIMUM INTERVAL, BETWEN PICTURES, OP 14 SECS. A MINIMUM INTERVAL, BETWEN PICTURES, OP 15 OUIRED POR THE TARGET INGE TO BE ELECTRICALLY 16 MAI CALLY TRIGGERED SO AS TO BE IN A PICTURE 16 MARN DIRECTED TOWARD THE BARTH. TRANSMISSION 17 SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 18 AT PH TRANSHITTER OPERATING AT A NOWINAL PRE- 17 THE EARTH'S SURFACE 18 GRAY  | DUCING A RES  | -   |
| H OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED S SECS. A MINIMUL INTERVAL, BETWEEN PICTURES, OP QUIRED FOR THE TARGET IRAGE TO BE ELECTRICALLY RRA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN MATICALLY TRIGGERED SO AS TO BE IN A PICTURE I WHEN DIRECTED TOWARD THE EARTH. TRANSMISSION SEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 ATT PH TRANSMITTER OPERATING AT A NOMINAL PRE- IZ.  R. THE EARTH'S SURFACE  F. THE CANTAGE  F. CONTROL OF THE CANTAGE  F. CO | 1.0 MILE. THE CAMERA HAS A SHUTTER SPRED OF 1.5 MILLISECONDS AND  |   |
| TO R STORAGE IN 12 SECS. A MALLHAL, BETWEEN PICTURES, OF  10 SECONDS IS REQUIRED FOR THE TARGET INAGE TO BE ELECTRICALLY ERASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITE'S SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PICTURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE BARTH. TRANSMISSION OF THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN 100 SECONDS BY A 2-WATT PH TRANSMITTER OPERATING AT A NOMINAL PRE-  12 PHENOMENA OBSERVED CLOUD COVER OVER THE EARTH'S SURFACE  13 MEASUREMENT RANGE  17 TO 8 LEVELS OF GRAY  18 PRECISION AND ACCURACY  | A VIDEO-BANDWIDTH OF 62.5 KHZ. THE 500 LINE FRAME IS PROCESSED  | `   |
| RA IS ALIGNED PARALLE MATICALLY TRIGGERED S MATICALLY TRIGGERED S SEL OF 32 PICTURES CAN ATT PH TRANSHITTER OP IZ.  R. THE BARTH'S SURFACE GRAY  | FOR STORAGE IN 12 SECS. A MINITED INTERVAL, BEIMEEN FICTURES, OF 10 SECONDS IS REQUIRED FOR THE TARGET IMAGE TO BE ELECTRICALLY |   |
| MATICALLY TRIGGERED SO AS TO BE IN WEEN DIRECTED TOWARD THE BARTH. THE OF 32 PICTURES CAN BE ACCOMPLIS ATT PH TRANSMITTER OPERATING AT A IZ.  THE BARTH'S SURFACE GRAY   | 4 123   |   |
| WHEN DIRECTED TOWARD THE EARTH. THE OF 32 PICTURES CAN BE ACCOMPLISION.  IZ.  I. THE BARTH'S SURFACE  GRAY   | AS TO BE IN A PICTU   |   |
| ATT PH TRANSMITTER OPERATING AT A IZ.  THE BARTH'S SURPACE  GRAY   | THE   |   |
| 22. PHENDMENA OBSERVED  CLOUD COVER OVER THE PARTH'S SURPACE 33. MEASUREMENT RANGE 7 TO 8 LEVELS OF GRAY 34. PRECISION AND ACCURACY  | TRANSMITTER OPERATING AT A  |   |
| CLOUD COVER OVER THE BARTH'S SURFACE 31 MEASUREMENT RANGE 7 TO 8 LEVELS OF GRAY 34. PRECISION AND ACCURACY   | 33 PHENDMENA DRSERVED   |   |
| <b>P</b> -1 ₹  | CLOUD COVER DVER THE BARTH'S SURPACE  |   |
| TO 8 LEVELS OF   |   |   |
|  | TO 8 LEVELS OF  |   |
|  |   |   |

| INSTRUMENT RESUME   | 38. SPE        |
|---|----------------|
| NATIONAL AERONANTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | 38. FIE        |
|   | 40.ANOU        |
| VIDICON CAMERA SYSTEM (TITLE CONT.)   | 42. POINT      |
| 69/   |                |
| A 7. ORGANIZATION 8. TELEPHONE  | 46, SPE        |
| RADOS, R. M. (MGR.) GODDARD SPACE FLT CRNTER 301-982-5347   |                |
|   | , 'C           |
| 12. GONTHACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15 START 16. CONTRACT NUMBER 15. STATUS   | 48. WEI        |
| is MONITOR 19 AGENCY SO PENCE 1 TELEBHONE   | 3              |
| H.L. NASA HDOTRS OSSA/SRO 202-962-  | 2              |
| RCA ASTRO-ELECTRONICS PRINCETON, NEW JERSEY 09/62 NA  | NO I           |
| TRUMENT TYPE . " .  | 62. TEL        |
| IMAGER, 0.5-INCH WIDE-ANGLE F/1.5 LOW-RESOLUTION VIDICON 28. APPLICATION  | FULL           |
|   |                |
|   | 63. ADV        |
| (R AND TRANSMIT PICTURES OF THE BARTH'S CLO   | BROA           |
| INDIALDUAL CLOUD IIEES OVER SPECIFIC AKEAS. ***SECONDARY-TO IEST<br>TV SENSOR IN SPACE.   | 1) SI          |
|   | Z) GO<br>NA UT |
| 31. PRINCIPLES OF OPERATION   | TV             |
| THIS CAMERA SUB-SYSTEM HAS FLOWN IN AN IDENTICAL CONFIGURATION ON TIROS 1-10-AND SIMILAR CONFIGURATION ON ESSA 1. ON TIROS 1-8, 10 THE CAMERAS WERE ALIGNED PARALLEL TO THE S/C SPIN AXIS AND | AYAI           |
| XTENDED   | IDEN           |
| PICTURES ON THE TUBE SCREEN. AN ELECTRON BEAN CONVERTS THE STORED   |                |
| PICTURES INTO TELEVISION-TIPE ELECTRONIC SIGNALS, WHICH CAN BE TRANSMITTED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM CAN ALSO  |                |
| PROCESS AND STORE UP TO 32 PICTURES ON MAGNETIC TAPE FOR TRANSMITSCION AT A LATER TIME THE CAMPRA HAS A WIND ANGRETICS DECI   |                |
| -   |                |
| CAMERA HAS A SHUTTER SPEED OF 1.5 MILLISEC AND A VIDEO-BANDWIDTH  |                |
| A MINIE   |                |
| HE TARGET INAGE TO BE PLECTRICALLY ERASED, THE  |                |
| LIGNED PARALLEL TO THE SATELLITE'S SPIN AXIS AND IS AUTOMATICAL-<br>LY TRIGGERED SO AS TO BE IN A PICTURE TAKING MODE ONLY WHEN DI-   |                |
| NSMISSION OF THE ENTIRE REEL OF   |                |
| PICTURES CAN BE ACCORPLISHED IN 100 SEC BY A 2-WATT PH TRANS-MITTER OPERATING AT A NOMINAL FREQUENCY OF 235 MHZ.  |                |
| CLOUD COVER AND THE BARTH'S SURFACE   |                |
|   |                |
| 7 TO 8 LEVELS OF GRAY   |                |
|   |                |
|   |                |

|            | 36. SPECTRAL RANGE 136. SPECTRAL RESOLUTION 17 TIME CONSTANT   |
|------------|--|
| ••••       | 38. FIELD OF VIEW 39. GROUND SWATH   |
| Q<br>N     | 74.0 BY 74.0 DEG 7.  |
| 11         |  |
| 0.5        | MED CIRCULA!   |
|            |  |
| T          | 4). COMPONENTS   |
| П          | 1V CAMERA, TRANSMITTER, TAPE RECORDER  |
| E          | B. MAGNETIC IN NUCLEAR IC HERMAL IN NULL OF WATTES   |
| T          | ON. INTERFERENCE DU INTERFERENCE DE MIERFERENCE DE UNTERFERENCE DE SAILECTING ISPD SAINTERFERENCE DE SAILECTING ISPD |
| П          | ALIBRATION 60. DATA RECOVERY 61 FREGUENCY OF DESI  |
| HIT.       | NO IN-FLIGHT CALIBRATION DELAYED AND REALTIME: DAYSIDE OF ORBIT 62. TELEMETRY REQUIREMENTS                           |
|            | L REEL OF 32 PICTURES CAN  |
| T          | AT FREQUENCY OF 235  |
| П          |  |
|            | BROAD SYNOPTIC VIEWING OF CLOUD-COVER PATTERNS, MORE VALUABLE  |
| -          | THE RECEIPED ON MANNON HINGE   |
| -          | CHIEVEMENTS IN SAT MET 1958-1964, NASA SP-9  |
|            | , AND LANDON, V.D.: KEY EQUIP FOR TIROS 1, AST   |
|            | 1960.***   |
|            | AND SPACECRAFT. NASA SP-3028, 1966.  |
| 80         | AVAILABLE FROM NATIONAL MEATHER RECORDS CTR (ESSA), ASHEVILLE, NC. 165. HISTORICAL REMARKS                           |
| N C        | IDENTICAL CAMERA PLOWN ON TIROS 1-10. SIMILAR CAMERA ON ESSA 1.  |
| 6          | O. O. D.   |
| 3          |  |
| 0 1        |  |
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| H.         |  |
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| AN<br>AN  | INSTRUMENT RESUME ATIONAL AERONAUTICS AND SPACE ADMINISTRATION   | 166  | ION 37, TIME CONSTANT  |
|---|--|--|--|
|   | ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS  | 38. FIELD OF VIEW 39. GROUND SWATH NA NA   |  |
| 1. TITLE  | 2 ACRONYM 3.   | NGULAR RESOLUTION 41. SPATIAL RESOL  |  |
| TITLE CONT.)  | A RESUME   | 42. PONTING ACCURACY 43. POINTING RATE 44. ALTITUDE (45.   | ATION  |
| 6. PRINCIPAL INVESTIGATOR   | 7. ORGANIZATION 8. TELEPHONE   | UUU3 NA INA INA INA INDITANI   | LUM PUSTGRADE  |
| S PENCER N. W.  | GODDARD SPACE PLT CENTER 301-982-5001  | 47. COMPONENTS   |  |
| 12. CONTRACT 13. CONTRACT NUMBER  | ODDARD SPACE PLT CRNTER  | GUARD ELECTRODE, COLLECTOR, POWER SOURCE 50. AVERAGE POWER 10. ETANGRY POWER 15.2.   | PEAK POWER 33. MTBF  |
|   | 20000  | Z R. MAGARING NUCCEAR HATTS  |  |
| GARBACZ, M. L.  | 0.5SA/SR0 202-962-   | 34. INTERFERENCE 135. INTERFERENCE 135. INTERFERENCE 137. INTERFER | GUARD ELECTRODE PROVIDED   |
| 22. VENDOR  | 23 LOCATION 24 CALE 25 LEAD TIME OF 16 N N   | 60. DATA RECOVERY DEDICAL DESTRUCT MARK DELAYED TOTAMEDY   | CONTINUED SERVATION  |
| 26. INSTRUMENT TYPE   |  | 1  |  |
| COUNTER, THER MAL-ELECTRON  | 20 CDACECBAET  | OUTPUT REQUIRES ABOUT '50 HZ RESPONSE O  | R 50 SAMPLES PER   |
| A P.T.  | TROS 7   | SECOND DIGITAL WORDS.  |  |
| PRIMARY-TO MEASURE  | PRIMARY-TO MEASURE IONOSPHERIC ELECTRON TEMPERATURE AND DENSITY,   | 43, ADVANTAGES AND LIMITATIONS   |  |
| SPACECRAFT.   | AND FOSTITYS ION DENSITY OF INE FLASOR IN INE VICINIII OF INE  | 1) INSTRUMENTS AND SPACECRAPT-OCT 57-MAR 65. N   | NASA SP-3028.1966.**   |
|   |  | . *2) MISSION PLAN TIROS 7, REPORT NO X-650-63-99, NAY 1963, NASA/ GSFC, ***3) SATELLITE AND ROCKET EXPERIMENTS DATA CATALOG. NASA   | NO X-650-63-99, MAY 1963, NASA/<br>EXPERIMENTS DATA CATALOG. NASA/ |
| 31. PHINCIPLES OF OF CHATION  |  | NATIONAL SPACE SCIENCE DATA CENTER, JAN. 68. ***   | BRACE, L.H. AND  |
| THE TIROS 7 ELECTRON TERPERATURE<br>FLOWN ON EXPLORER 11 AND 22. THE<br>GRAPD RIP PRODE AND A 9-TNCH COLL | THE TIROS / ELECTRON TERPERATURE PROBE IS SIMILAR TO THE PROB<br>FLOWN ON EXPLORER 11 AND 22. THE SENSOR CONSISTS OF A 5-INCH<br>GTARD RIP TRODE AND A 9-INCH COLLECTOR OF 0.022-INCH DIAMETER | REDDY, B. M.: BARLY ELECTROSTATIC PROBE RESULYS G. HIGHLY, 1, 100 E. J. 1965. ***5) DATA AVAILABLE PROK  | FROM EXPLORER 22.<br>NASAZGSECZNSSDC.                              |
|   | ′≍ .   | SIMILAR  |  |
| MANDIATELY ADJACENT TO THE SPOSSIBLE RELATED DISTURBANCE ATPR SAVER SHAPPD VOLTAGE                        | COLLECTION OF CURRENT IN THE REPORT AND THEREFORE AVOIDS OF THE MESSURGMENTS. AN APPROPENT TO THE MESSURGMENTS IS APPITED REPORTS.   | <br>z 2  |  |
| THE CYLINDRICAL EL CURRENT IS MONITOR   | SATRILITE SHELL UDE AND SHAPE OF   | 9 20   |  |
| TENT OF THE SATELL AMBIENT ELECTRON A THESE   | OF THE E SINCE T   |  |  |
| TURE AND DENSITY, ANALYSIS OF THE WO  |  |  |  |
| ;   |  |  |  |
| 33. PHENOMENA OBSERVED  |  |  |  |
| AMELENT THERNAL BLECTRONS AND TONS 33. MEASUREMENT RANGE  | ECTRONS AND IONS   |  |  |
| 34. PRECISION AND ACCURACY  |  |  |  |
|   |  |  |  |
|   |  | -  |  |

| INSTRUMENT RESUME  | 35. SPECTRAL BAN                        |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 38. FIELD OF VIEW                       |
| 1. TITLE Z. ACRONYM 3. EXP NO  | 40.ANGULAR RESOLUT                      |
| LOW-RESOLUTION ORNIDIRECTIONAL RADIOMETER LROR   | NA<br>42, POINTING ACCUHACY             |
| 11/10/69   | NA                                      |
| INVESTIGATOR 7. ORGANIZATION 8. TELEP  | 46. SPECIAL REQUI                       |
| SUCNIL, DR. V.E. UNIVERSITY OF WISCONSIN 608-262-5938  9. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE   | 47. COMPONENTS                          |
| R. J. UNIVERSITY OF WISCONSIN (  | DETECT                                  |
| NOMBER   | 48. WEIGHT 45.                          |
| VCY 20. PGM OFFICE 21. TELEPHO   | 54. INTERFERENCE 5                      |
| GARBACZ, M.L. NASA HDOTRS OSSA/SRO 202-962-4291  | 59. CALIBRATION                         |
| SITY OF WISCONSIN MADISON, WISCONSIN 06/63 NA  |   |
| WOTHER TOSSIGNATOR OF THE PROPERTY OF THE PROP | 52. TELEMETRY R                         |
| 1  | CONTINUOUS                              |
| MET<br>TO SUBSPICE   | COMMAND FR                              |
| 1- TO MEASURE THE GROSS HEAT BUDGET OF THE EARTH. ***  |   |
| S ECONDARY-TO DETERMINE HOW HUCH SOLAR ENERGY IS ABSOLUBED, RE-  | 000000000000000000000000000000000000000 |
| PLECTED, AND MALTIED BY THE MAKIN AND LES ATMUSPHERE AT THE INDORP BOHNDARY. THE TO STEDY THE DRIME DRIVING PORCE OF THE   | 1) HOUSE P                              |
| MOSPHERE.  |   |
| 31. PRINCIPLES OF OPERATION  | THE EARTH                               |
| S PLOWN IN AN IDENTICAL CONFIGURATION  | 4) DATA AVA                             |
| 3, 4, AND 7, AND WAS ALSO SIMILAR TO ONE ON EXPLORER 7. TWO WIDE   | KASA/GS.P.C.                            |
| ANGE (100 DEG FOY) LOW-RESOLUTION IN DELECTION DEVICES, EACH   | TDFNTTCAL                               |
|  | 66. DIAGRAMS                            |
| THE SATELLITE DOES NOT INTERPERE WITH THE PIELD-OF-VIEW. THE   |   |
| SATELLITE'S BODY. BOTH BOLOMETERS HAVE A HIGH ABSORPTIVITY TO  |   |
| THE IR RADIATION FROM THE BARTH. THE BLACK BOLOMETER ALSO HAS A  |   |
| HIGH ABSORPTIVITY FOR SOLAR RADIATION. THUS BUTH REFLECTED AND ENTITED RADIATION CAN BE MEASURED. THE TEMPERATURE OF THE HEMIT   |   |
| SPHERES IS GIVEN BY ATTACHED TERMISTORS. MATCHED PAIRS OF THER-  |   |
| MISTORS ARE CONNECTED IN SERIES WITH SIMILAR SENSORS ON OPPOSITE   | -                                       |
| TURE RECEIVED PROM THE SATELLITE IS AN AVERAGE OF TWO TEMPERA-   |   |
| TURES FROM MATCHED THERMISTORS AND SIMULATES THE RESPONSE OF AN  |   |
| INCLUDES TEMPERATURES OF THE MIRRORS AND SENSORS AND A FIXED   |   |
| RESISTANCE VALUE WHICH ALLOWS ONE TO COMPENSATE FOR DRIFT OF THE PIGGROUNTS IN THE SATELLITE   |   |
| 32. PHENOMENA OBSERVED   |   |
| RADIANT RNERGY REFLECTED AND EMMITTED BY THE EARTH.  |   |
| 128 DEG K TO 488 DEG K   |   |
| 34, PRECISION AND ACCURACY   |   |
| 0. 1 KELVIN DEGREE   |   |
|  |   |

|                   | õ  |
|-------------------|--|
|                   | 0.3 TO 50.0 MICRON   |
|                   | OF VIEW 39. GROUND SWATH   |
| N NO              | 2  |
|                   |  |
| Verhalon<br>O O C | AS, POINTING ACCURACY 43, POINTING RATE AS, ALTITUDE AS, INCLINATION NA NA NA NA NA CTROTTAR MEDITIM POSTGRADE   |
|                   | PECIAL REQUIREMENTS  |
| T                 | CALL AND ALL A |
| T                 | NO DEVICES   |
| Ī                 | ì  |
| IGHT              |  |
|                   | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING  |
| 1                 | ES CALIBOATION RO DATA BEFORES REPEDIENCY DE DRÉSENATION   |
|                   | >ararararara   |
| Z/.               |  |
| UNC               | IS AND OTHER IR EXPTS ON-BOARD ARE I   |
|                   | OUSLY FOR ONE ORBIT ON M   |
|                   | COMMAND FROM ONE OF THE GROUND STATIONS.   |
|                   | מיייי של היייי של היייי של הייייי  של היייייי של היייייייי של היייייייייי  |
|                   |  |
|                   | CES  |
|                   | USE, F.B., RADIATION BALANCE OF THE EARTH FROM   |
|                   | OF WISC. 1900. 112.   ONDERHORN TOUR STORY TO STAND TO STAND THE STORY STANDS STORY  |
|                   | COTON DIAN STROKE TO CORT BOST NO. V-650-63-09   |
| ROS               | U) DATA AVAILABLE PROM NATIONAL SPACE SCIENCE DATA CENTER.   |
| IDE               |  |
|                   |  |
| ROR,              | IDENTICAL INSTRUMENT FLOWN ON TIROS 3, 4, AND 7; SIMILAR ON EXP 7  |
|                   |  |
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| INSTRUMENT  | MENT RESUME   |                      | 0.25                    |
|---|---|----------------------|-------------------------|
| ELECTRONIC<br>CAMBRIDGE   | AFRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   |                      | 38. FIELD OF V          |
| ), TITLE  | 2 ACRONYM   | YM 3. EXP NO         | 40.ANGULAR HES          |
| MEDIUM-RESOLUTION RADIOMETER (TITLE CONT.)  | MRR<br>4. RESUME<br>DATE  | 5. VERSION           | 5.0                     |
| B. PRINCIPAL INVESTIGATOR 7. ORGANIZATION   | 11/10/69<br>118. TELEPHONE  | 769 0004             | 46, SPECIAL RE          |
|   | CE FLT CENTER   | 347                  | 47. COMPONEN            |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLAS   | 14. FLASH INDEX NUMBER 16. DATE 18. DATE 18. DATE   | rATUS                | RADIOMET                |
| 18. MONITOR 19. AGENCY  | 20.PGM OFFICE 21. TELEPHONE   | POST PLIGHT          | 54. INTERFEREN          |
| GARBACZ, R.L. NASA HDOTRS   | 055A/SRO 202-962-   | 1291<br>25.LEAD TIME | 59. CALIBRATI           |
| ENGINEERING CO  | CONN. 06/63   | ¥A 2%                | SPACE LO                |
| RADIONETER, 5-CHANNEL THERMISTOR-BOLONETER MED-RES SCANNING<br>22, APPLICATION  | STOR-BOLOMETER MED-RES SCANI  | 17                   | 7 PREQUE                |
| AET<br>30. PURPOSE  | TIROS 7   |                      | 63. ADVANTAG            |
|   | IERNAL AND REFLECTED SOLAR RADIATION PHERE IN 5 SPECTRAL REGIONS. PARAM-                            | RADIATION PARAM-     | AN UNCER<br>BECAUSE     |
| C #   | BE STUDIED ARE STRATOSPHERIC TEMPERATURES VIA THE ISORPTION BAND OF CO2, DAY-NIGHTTIME CLOUD COVER, | THE 15               | 1) TIROS                |
| ALBEDO, AND THERMAL RADIATION, TO RESEARCH IN ATMOSPHERIC PROPERTIES.   | N. TO GENERATE RADIATION MAPS<br>ERTIES.  | S FOR                | 30, 64. **<br>68-01, J  |
| TIROS 2,3,4,7, AND NIMBUS 2 CONTAINED 5 CHANN   | CONTAINED 5 CHANNEL SCANNING RADIOM-  | RADIOM-              | 4) GOLDBE               |
| E S   | THE NIMBUS<br>NSTRUMENT   | DESIGN.              | 65. HISTORICA           |
| TIROS SERIES PRE TIROS 7 THEY WERE:   | FOR EACH<br>2-6.0; 8.   | PI.IGHT,             | SIMILAR<br>66. DIAGRAMS |
| 0.55-0.75 MICRONS.<br>DETECTORS ALTERNATE   | RRENCE LEVEL WAS OBTAINED BY HAVI<br>)K INTO SPACE AT 45 DEGREE ANGLE.                              | HAVING NGINGINGING   |                         |
| EACH CHANNEL HAS THE SAME PRI   | PRINCIPLE OF OPERATION: THE A)  | THE ALTERNAT-        |                         |
| AL TO THE DIFFERENCE IN RADIA   | ATION ENERGY COMING PROM 2 (  | PPOSITE              |                         |
| DIRECTIONS (THROUGH THE SATELLITE WALL AND BASE) AND IMPLNGENT<br>UPON A CHOPPER DISK THAT HAS ALTERNATE BLACK AND MIRRORRD | ALTE WALL AND BASE) AND IMEALTERNATE BLACK AND MIRRORI  | TNGENT               |                         |
| HALVES. ALL 5 DISKS ROTATE SI<br>IDENTICAL OUTPUT CIRCUITRY TO  | SIMULTAN BOUSLY AT 46 RPS AND HAVE<br>TO PREAMPLIFIERS AND TAPE RECORDERS                           | HAVE<br>CORDERS.     | -                       |
| SATELLITE SPIN IS USED TO PRO   | _   | WHICH IS THEN        |                         |
| 200   | $\sim$  | SATEL-               |                         |
| W DICHOMENIA OPERATED   |   |                      |                         |
| AZ PRETOTRENA CASENTED AND ATMOSPHERE IN 5 SPECTRAL REGIONS 33 MASUREMENT RANGE   | SPHERE IN 5 SPECTRAL REGIO  |                      |                         |
| 34. PRECISION AND ACCURACY  |   |                      |                         |
|   | DB: ABSOLUTE ACCURACY OF  | -7 DEG K             |                         |

|          | RANGE  |
|----------|--|
|          | 38 FIELD OF VIEW 10 GROUND SMATH   |
|          | 5.0 DEG 35 NR DIAM CIRCLE FROM 400 NR ALTITUDE   |
| ON O     | 11. SPATIAL RESOLUTION   |
| PSION    | 5.0 DEG 35 NH AT CRNTER FROM 400 NH ALTITUDE  42. POINTING ACCURACY   43. POINTING RATE   44. ALTITUDE   45. INCLINATION |
| 004      | 46. SPECIAL REQUIREMENTS MED CIRCULAR MEDIUM POSIGRADE   |
| П        | 1) POMBONIENTS   |
| ТТ       |  |
| HT       | 6 LB NAGNETIC NUCLEAR ATTERMAL   |
| 7        | 34. INTERFERENCE 55. INTERFERENCE 36. INTERFERENCE 57. INTERFERENCE 58. SHIELDING SENSITIVE                              |
| w l      | • 60. DATA RECOVERY  |
| , in (i) | PACE LOOK FOR ZEROING DELAYED TELEMETRY CONTINUOUS. TELEMETRY REQUIREMENTS   |
| U I      | 7 PREQUENCY BANDS ARE USED FOR TOTAL IR PACKAGE (LOW + MED IR),<br>THE 7 CHANNELS HAVE A WIDTH OF 310 HZ.                |
| 7        | 63. ADVANTAGES AND LIMITATIONS   |
| TON<br>T | AN UNCERTAINTY EXISTS IN THE ABSOLUTE VALUES OF THE MEASUREMENTS ASCAUSE OF NO INPLIGHT CALIBRATION.                     |
|          | 1) TIROS 7 RADIATION DATA CATALOG AND USER'S MANUAL V.1, GSPC, SEPT 30 64 ***) DATA CATALOG OF CATRITTE AND BOCKET PYDES |
|          | 68-01, JAN 68. NASA/GSFC NATIONAL SPACE SCIENCE DATA CTR. * * * * * * * * * * * * * * * * * * *                          |
| 분        | TRUMENTS FOR SATELLITES, NASA  |
|          | BE HISTORICAL REMARKS SIMILAR RADIOMETERS FLOWN ON TIRDS 2,3,4,7 AND NIMBUS 2 (MRIR) (66 DIAGRANS                        |
|          |  |
| 1 2 2    |  |
|          |  |
| •        | -  |
|          |  |
|          |  |
| TTT      |  |
|          |  |
| ×        |  |

| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS 1. TITLE                     | 200  | 38 FIRE OF VIEW 130 GROUND WATH   |
|---|--|---|
|   |  | THE DOT VIEW  |
|   | 2. ACRONYM 3. EXP NO                                   | H4.0 BY 14.0 DES TOURS OF THE STATE ALTITUDE  |
| VIDICON CAMERA SYSTEM   | SW   | 2 TV-LINE FROM 475 NM A   |
| (TITLE CONT.)   | 4. PESUME 5. VERSION                                   | 42, POINTING ACCURACY 142, POINTING RATE 44, ALTITODE 45, INC. 1A1.ON BOLTTONDO NODITINA DOCTTONDO                                      |
| $\vdash$  | 8. TELEPHONE   | CTucopus Henton   |
| RADOS, B. M. (MGR.) GODDARD SPACE PLT CENTER  | 301-982-5347   | AT COMBONICARY.   |
| יין פויפאווידאווידאווידאווידאווידאווידאווידא  |  | THE CAMERA, TRANSMITTER, TAPE RECORDER  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. START   | 16. COMPLETION 17. STATUS                              | EIGHT 15. VOLUME SO. AVERAGE POWER 11. STANDBY FORMER 15. P.E.  |
| 19 AGENCY 20.PGM OFFICE 2   | GM OFFICE 21. TELEPHONE                                | 54. ATTENDARY SHIP NOCKERAL SHIP NOCKERAL STREETS SHIELDING   |
| Z, H.L NASA HDOTRS OSSA/SRO   |  | ENSITIVE. MAGNE   |
| ECTRONICS PRINCETON, NEW JERSE  | 24 DATE 20 LEAD T                                      | 19. CALIBRATION 10. IN-FLIGHT CALIBRATION DELAYED AND BRALTINE DAYSIDE OF ORBIT   |
| INACER. O STINCH WIRE WASTE W/1.5 LOW-RESOLUTI  | TON VIDICON UNC.                                       | Z   |
| PLICATION   | SAAFT  | TTER OPERATING AT FREQUENCY OF 235 MHZ.   |
| NET TIROS   | 7  | ,63. ADVANTAGES AND LIMITATIONS   |
|   | S OF THE BARTH'S CLOUD                                 | 4G 0P   |
| COVER TO PROVIDE METROROLOGISTS WITH DETAILED INDIVIDUAL CLOUD TYPES OVER SPECIFIC AREAS.***                                    | DETAILED INFORMATION ON<br>AREAS *** SECONDARY-TO TEST | DATA FOR WEATHER ANALYSIS THAN FROM RED OR NARROW ANGLE CAMERAS.  |
| TV SENSOR IN SPACE.   |  | 1) SIGNIFICANT ACHIEVEMENTS IN SAT MET 1958-1964. NASA SP-96.***  |
|   |  | .2) GOLDBERG, E.A. AND LANDON, V.D.: KEY ROULP FOR TIROS : ASTRO-<br>NACTICS, V.5. JUNE 1960, ***3) RESNER, M. H. AND STANISZEWSKI. J.: |
| 31. PRINCIPLES OF OPERATION   |  | TV CAMERAS FOR SPACE EXPLOR. ASTRONAUTICS, V.S. MAY 1960.***  |
| SRA SUB-SYSTEM HAS PLOWN IN AN IDEN   | CAL CONFIGURATION                                      | 4) INSTRUMENTS AND SPACECRAFT, NASA SP-3028, 1966, ***5) DATA   |
| ON ITMOS 1-10 AND SINITAR CONFIGURATION ON ESSA<br>THIS FLIGHT(TIROS 7) 2 WIDE ANGLE CAMERAS WERE 1                             | I HOMEVER,<br>JSED, IT CONS                            | S RECURDS CIR   |
| OF A 1/2 IN VIDICON TUBE AND A POCAL-PLANE SHUTTER THAT PERMITS   | UTTER THAT PERMITS                                     | IDENTICAL CAMERA PLOWN ON TIROS 1-10. SIMILAR CAMERA ON ESSA 1.   |
| STORAGE OF STILL PICTURES ON THE TUBE SCREEN.   | CREEN. AN ELECTRON BEAM                                | 66. DIAGRAMS  |
| CONVENTS THE STORED PICTURES INTO TELEVISION-TYPE ELECTRONIC<br>STENAIS WHITH CAN BE TRANSMITTED TO CROSSED RECEIVERS ON COMM   | TYPE ELECTRONIC  |   |
| THE SYSTEM CAN ALSO PROCESS AND STORE UP TO 32  | P TO 32 PICTURES ON MAG-                               |   |
| NETIC TAPE FOR TRANSMISSION AT A LATER TIME. T  | TIME, THE CAMERA HAS A                                 |   |
| WILDS ANGLE (10) DEG) BLESSI F/1.5 LENS EGUULLN<br>1.4 TO 2.0 NM. THE CAMERA HAS A SHUTTER SPEED                                | SPEED OF 1.5 MILLSEC                                   |   |
|   | 500 LINE FRAME IS PRO-                                 |   |
| CESSED POR STORAGE IN 2 SECS. A MINIMUM INTERV  | INTERVAL OF 10 SEC BE-                                 |   |
| INEES FILIDES IS REQUIRED FOR THE TARGET THAGE TO BE ELECTRI-<br>CALLY BRASED. THE CAMERA IS ALIGNED PARALLEL TO THE SATELLITES | ALLEL TO THE SATELLITES                                |   |
| SPIN AXIS AND IS AUTOMATICALLY TRIGGERED SO AS  | AS TO BE IN A PIC-                                     |   |
| TURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE<br>STON OF THE ENTIRE REEL OF 32 DICTURES CAN BE                                 | ARD THE EARTH, THANSELS-<br>CAN BE ACCOMPLISHED IN     |   |
| SEC BY A 2-WATT PH TRANSMITTER OPERATION  | AT A NOMINAL FRE-                                      |   |
| OUBNCY OF 235 MHZ.  |  |   |
|   |  |   |
| 33. MEASUREMENT RANGE   |  |   |
| 7 TO 8 LEVELS OF GRAY   |  |   |
|   |  |   |

| IN STRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS                      |   | 0,45 TO<br>38. FIELD OF VIEW<br>89.0 BY 89.0                                   |
|--|---|--|
| TITLE ATOMATIC PICTURE-TRANSBISSION SYSTEM (TITLE CONT.)   | A PT 6. VERSION                         | 40, ANGULAR RESOLUTION 41. SPA.  0.16 DEG 1.7  42, POINTING ACCURACY 43, POINT |
| 6. PRINCIPAL INVESTIGATOR 1. ORGANIZATION  | 10/69                                   | 1.0 DEG 0.1  |
|  | 301-982-6163                            | 47. COMPONENTS   |
| AMIN TOACT   | 18 COMPLETION 17 CTATIIS                | VIDICON, ELECTRON  |
|  | POST PLIGHT                             | 24 LB  |
| Z. M. L. NASA HDOTRS   | 202-963                                 | SENSITIVE SENSIT   |
| RECEABLE PROCEROUICS PRINCETON, N.J.   |   | FIDUCIAL MARKS IN  |
| IN A MARKET OF THE AUTORATIC-PICTURE-TRANSMISSION VIDICON OF ANALOGY.  | VIDICON UNC                             | PICTURE IS COMMUN  |
|  | 8                                       | INUM BANDWIDTH C   |
| PRIMARY TO PROVIDE REAL TIME WIDE-ANGLE CLOUD COVER DEB LOCAL USERS. ** * SECONDARY TO CHECKOUT SENSORS IN PUTURE OPERATIONAL TOS PLIGHTS. | COVER PICTURES FOR                      | OIRECT TRANSMISSI<br>MEDIATE STORAGE.  |
|  |   | 1) SIG ACHIEV IN A. AND STROUD, W.   |
| 31. PRINCIPLES OF OPERATION  |   | REVIEW OF A DECAL  |
| THE APT SYSTEM, CONSISTING OF A 1-IN VIDICON ARRANGEMENT,  | ARRANGEMENT, WAS                        | TEOROLOGY, PRESEN  |
| OPERATIONAL TOS FLIGHTS: ESSA 2,4,6, AND TIROS M (2 CAMERAS).  | S M (2 CAMERAS).                        | 65. HISTORICAL REMARKS   |
| TRIC LANCOR USED INTITUTES OF THE PHOTOCONDUCTOR TO  | HOTOCONDUCTOR TO                        | 66. DIAGRAMS   |
| STORE THE SCENE INFORMATION. HOWEVER, SINCE I  | TE FLECTRON BEAM                        | ···  |
| UPGRADED FOR PUTURE PLIGHTS. THE CAMERA UTILI  | ZES A TEGEA-KINOP-                      |  |
| THE SYSTEM AUTOMATICALLY TAKES AND TRANSMITS A PICTURE BURRY 2   | PICTURE EVERY 208                       | -  |
| SECS WHILE THE SATELLIE IS IN DAYLIGHT. OFTI   | PERCENT OF ONE PIC-                     |  |
| TURE ELEMENT. AN 8-SECOND TURN-ON AND SYNC SI  | SNAL PRECEDES THE                       |  |
| 1200-3550MD INGRESIDATION AT MILE THE TELECON TO SCREEN AT THE SCAN LINES AT THE SCAN LINES AT THE SCAN LINES AT THE SCAN LINES.           | Z WITH SCAN LINES                       |  |
| PERFERENCE TO THE ORBIT TRACK. A SHARI IV IRANSHIFFER BROADCASTS THE SIGNAL IN THE 136.95 MHZ BAND. AN APT GROUND SIV                      | MHZ BAND, AN APT GROUND STA-            |  |
| TION WITH AN APPROPRIATE ANTENNA, RECEIVER, AND A REC<br>RECEIVE THESE PICTURES WHEN THE SPACECRAPT IS WITHIN                              | ND A RECORDER CAN<br>WITHIN ACQUISITION |  |
| RANGE, APT IS COMPATIBLE WITH COMMERCIAL 240 RPM PAX 32 PHENOMENA OBSERVED   | 3PH PAX EQUIPMENT.                      |  |
| CLOUD AND TERRAIN FEATURES APPROXIMATELY 1.7 NM OR LARGER 33 MEASUREMENT MANGE   | M OR LARGER                             |  |
| DYNAMIC PICTURE RANGE OF 10:1  |   |  |
|  |   |  |

|              | 38. SPECTRAL RANGE 38. SPECTRAL RESOLUTION 37. TIME CONSTANT 0.45 TO 0.65 MICRON NA 38. FIELD OF VIEW 39. GROUND SWATH   |
|--------------|--|
| 02           | 99.0 BY 89.0 DEG 1200 NM BY 1200 NM FROM 450 NM ALTITUDE ADANGOLAR RESOLUTIONAL SPATIAL RESOLUTION OF 15 NM PROM 150 NM ALTITUDE   |
| RSION        | TINE ACCURACY 43. POINTING BACK TO THE 44. ALTITUDE TO THE TANK TO THE TANK TO THE TANK TO THE TANK TH |
| 3            | 46. SPECIAL REQUIREMENTS PEG/SEC   TEIL CIRCULAR   TEULUS   POSIGRADE   46. SPECIAL REQUIREMENTS   |
| П            | 151  |
| T            | VIDICON, ELECTRONICS, TRANSMITTER, TAPE RECORDER 48. WEIGHT 49. VOLUME 50. AVERAGE POWER   51. STANDBY FOWER   52. PEAK POWER   53. MTBF   |
| HT           | 54 LB MAGNETIC NUCLEAR 15, INTERCEDENCE 156, INTERCEDENCE 157, INTERCEDENCE 158 SHIELDING  |
|              |  |
| П            | DUCIAL MARKS INCLUDED REALTIME TELEMETRY   |
| ž            | CTURE IS COMMUNICATED TO AN EARTH STATION IN THE SPACE RE-   |
| $\Box$       | VIDEO OUTPUT   |
|              | ANT AGES AND LIMITATIONS   |
| 8            | DIRECT TRANSMISSION ON CONHAND TO MANY RECEIVERS WITHOUT INTER-<br>MEDIATE STORAGE. DIELECTRIC SURPACE OF VIDICON LIMITED TUBELIPP.  |
|              | G64 NASA SP-96 +** 2) STAMPET  |
|              | STROUD, W.G.: THE APT IV CAMERA SYSTEM FOR MET   |
| П            | 13, FEB 1959.***3) USIROW, H. AND WEINSTRIN, U.:<br>1 DECADE OF SPACE CAMERA SYSTEMS DEVRIOPMENT FOR ME-   |
|              | ENTED AT 13TH P<br>NSTRUMENTATION  |
| J            | SIMILAR TO APT ON NIMBUS 1 AND 2, ESSA 2, 4,6; SCHED FOR TIROS M   |
|              |  |
| AS           |  |
| i            |  |
|              |  |
| <del>ل</del> |  |
| T.           |  |
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| - K          |  |
| NO           |  |
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| П            |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESERVED, CANADONICE WASSACHIMETER                  | NO 18 NO 18 SPECTRAL RESOLU  TO 0.65 NICRONS NA  VIEW 10 189 GROUND SWATH  |
|---|--|
| 1. TITLE 2. ACRONYM 3. EXP NO   | 14.0 BY 74.0 DEG 725 NM BY 725 NM PROM 450 NM ALTITUDE   |
| H   | LINE FROM 450 N  |
| 11/10/69  | 1  |
| R 7. ORGANIZATION 8, TELEPI   |  |
| RADOS, R.M. (MGR.) GODDARD SPACE FLT CENTER 301-982-5347  | 47. COMPONENTS   |
| 4   | RA, TRANSMITTER, TAPE RECORDER   |
| 12. Type 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 16. SAIL 11. STATUS POST PLIGHT                                    | 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDBY POWER 52. PEAK POWER 53. MTBF  |
| 3.7 19. AGENCY 20. PGM OFFICE 21. TELEPHO   | E.55 INTERFERENCE 16 INTERFERENCE 57 INTERFERENCE 58 SHIELDING   |
| GARBACZ, M.L. NASA HDQTRS OSSA/SRØ 202-963-4291   | 35 CALINEATION 61 DATA RECOVERY 151 RECOVERY   |
| ECTRONICS PRINCETON, N. J. 12/63 NA   | SHT CALIBRATION DELAYED AND REALTIME   |
|   |  |
| IRAGER, MIDE-ANGLE F/1.5 LOW-RESOLUTION 0.5-INCH VIDICON UNC.   | FULL REEL OF 32 PICTURES CAN BE READ OUT IN 100 SECONDS USING AN PROPERTY OF 235 MHZ.  |
| HRT TIROS 8   | ,  |
|   |  |
| PRIMARY-TO ACQUIRE AND TRANSMIT PICTURES OF THE EARTH'S CLOUD COVER TO PROVIDE METEOROLOGISTS WITH DETAILED INFORMATION ON      | BROAD SYNOPTIC VIEWING OF CLOUD COVER PATTERNS. MORE VALUABLE<br>DATA POR WEATHER ANALYSIS THAN PROM HED OR NARROW ANGLE CAMERAS |
| IPIC A  | 64. REFERENCES   |
| TV SENSOR IN SPACE.   | 1) SIGNIFICANT ACHIEVEMENTS IN SAT MET 1958-1964, NASA SP-96.***   |
|   | NAUTICS, V.5, JUNE 1960.***3) MESNER, M.H. AND STANISZEWSKI, J.:   |
| 1   | TV CAMERAS FOR SPACE EXPLOR. ASTRONAUTICS, V.S. MAY 1960.***   |
| ۳,  | 4) INSTRUMENTS AND SPACECRAPT, NASA SP-3028, 1966, ***5) DATA  |
| ON TINOS A-TO AND SIMILAR CONFIGURATION ON ESSA 1: ON TIROS 1-8,  | AVALLABLE FROM NATIONAL MEATHER RECORDS CTR (BSSA) ASHEVILLE NG. 65. HISTORICAL REMARKS  |
| THROUGH THE BASE PLATE. IT CO   | IDENTICAL CAMERA PLOWN ON TIROS 1-10. SIMILAR CAMERA ON ESSA 1.  |
| A POCAL-PLANE SHUTTER THAT PE   | 66. DIAGRAMS   |
| DICTURES ON THE TOBE SCREEN. AN ELECTRON BEAM CONVERTS THE STORED DICTURES ATTENDED   |  |
| 4 20  |  |
| MAGNETIC TAPE   |  |
| MISSION AT A LATER TIME, THE CAMERA HAS A WIDE-ANGLE (105 DRG)  |  |
| CAMERA HAS A SHUTTER SPEED OF 1.5 MILLISEC AND A VIDEO-BANDMIDTH  |  |
| OF 62.5 KHZ. THE 500 LINE PRAME IS PROCESSED FOR STORAGE IN 2   |  |
| SEC. A MINIMUM INTERVAL OF 10 SEC BETWEEN PICTURES IS REQUIRED<br>FOR THE TARGET IMAGE TO BE PLECTRICALLY ERASED. THE CAMPRA IS |  |
|   |  |
| TAKING MODE ON  |  |
| RECTED TOWARD THE EARTH. TRANSMISSION OF THE BUTIRE REEL OF 32 OFTHERS CAN BE ACCOMPTIONED IN 100 SPC BY A DEMAND BRANSHOT      |  |
| AT A NOMINAL PREQUENCY OF 235 MHZ.  |  |
| 32. PIERVARIA UBSERVED  |  |
| 33 MEASUREMENT RANGE  |  |
| 7 TO 8 LEVELS OF GRAY   |  |
| 34. PRECISION AND ACCURACY  |  |
|   |  |
|   |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS SERSEARCH CENTER CAMBINDGE, MASSACHUSETTS  | 36. SPECTRAL FAMICE 36. SPECTRAL RESOLUTION 37. TIME CONSTANT 36. FIELD OF VIEW 374. O RY 74. O RRG 750 NN RY 750 NN W PROM 500 NN ALTITITIE |
|--|--|
| 1. TITLE 2. ACRONYM 3. EXP NO  | HESOLUTION 41, SPATIAL RESOLUTION  |
| CAMERA SYSTEM VCSW   | LINE FROM 500 NI   |
| UTINE CON!   | 42. POINTING ACCUMACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION   |
| R 7. ORGANIZATION 8. TELEPH  | POTGER STUTES  |
| RADOS, R. M. (MGR.) GODDARD SPACE PLT CENTER 301-982-5347  o. CO:INVESTIGATOR  10. ORGANIZATION  11. TELEPHONE   | 47. COMPONENTS   |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. 517AT 16. CONTRACT NUMBER 15. 517AT 16. CONTRACT NUMBER 15. 517AT 15.  | TV CAMERA, IRANSMITTER, TAPE RECORDER 48. WEIGHT 49. VOLUME   19. AVERAGE POWER 51. FINNON POWER 52. PEAK POWER   53. MTBF                   |
| POST PLICHT  | WATTS NONE 9 WATTS   |
| 7. M.L. NASA HOOTRS OSSA/SRO 20.26.3-429   | 64. INTERFERENCE 58. INTERFERENCE 58. INTERFERENCE 59. SHIELDING USED.    SENSITIVE   MAGNETIC SHIELDING USED.                               |
| N. N. J. 01/65 NA  | SHT CALIBRATION  |
| -ANGLE P/1.5 LOW-RESOLUTION 0.5-INCH VIDICON   | PULL REEL OF 48 PICTURES CAN BE READ OUT IN 120 SECONDS USING  |
|  | braithe at factorice 233   |
| 4POSE  |  |
| PRIMARY-TO ACQUIRE AND TRANSMIT PICTURES OF THE EARTH'S CLOUD COVER TO PROVIDE METEOROLOGISTS WITH DETAILED INFORMATION ON INDIVIDUAL CLOUD TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST | BROAD SYNOPTIC VIEWING OF CLOUD COVER PATTERNS, MORE VALUABLE DATA FOR WEATHER ANALYSIS THAN FROM MED OR NARROW ANGLE CAMERAS 64. REFERENCES |
| TV SENSOR IN SPACE.  | 1) SIGNIFICANT ACHIEVEMENTS IN SAT MET 1958-1964. NASA SP-96.*** 2) GOLDBERG, E.A. AND LANDON, V.D.: KEY EQUIP POR TIROS 1. ASTRO-           |
| 31. PRINCIPLES OF OPERATION  | NAUTICS, V.5, JUNE 1960.***3) MESNER, M.H. AND STANISZEMSKI, J.:   |
| NGLE TV CAMERA WAS   | INSTRUMENTS AND SPACECRAPT, NASA SP-3028,  |
| ON ALL TIROS MISSIONS AND SSSA 1. HOWEVER, THIS FLIGHT CARRIED   | AVAILABLE FROM NATIONAL WEATHER RECORDS CTR (ESSA), ASHEVILLE, NC. 65. HISTORICAL REMARKS  |
| ACECRAPT AND CANTED 26 DEG TO EACH SIDE OF THE PLANE OF THE  | BASIC CAMERA IDENTICAL TO THOSE PLOWN ON TIROS 1-10 AND ESSA 1.  |
| ERA WAS AUTOMATICALLY TRIG-  | 66. DIAGRAMS   |
| EARTH (ONCE EACH ORBIT). EACH CAMERA CONSISTS OF A 1/2-INCH VIDI-  |  |
| CON TUBE AND A POCAL-PLANE SHUTTER THAT PERMITS STORAGE OF STILL   |  |
| STORED PICTURES INTO IN-TYPE ELECTRONIC SIGNALS, WHICH CAN BE  |  |
| TRANSMITTED TO GROUND RECEIVERS ON COMMAND. THE SYSTEM CAN ALSO  |  |
| TRANSMISSION, THE CAMERA HAS A WIDE-ANGLE (105 DEG) ELGEET F/1.5   |  |
| ILLISEC AND A  |  |
| BANDWIDTH OF 62.5 KHZ, THE 500 LINE FRAME IS PROCESSED FOR   |  |
| IS REQUIRED FOR THE TARGET IMAGE TO BE ELECTRICALLY ERASED.  |  |
| TRANSMISSION OF THE ENTIRE REEL OF 48 PICTURES CAN BE ACCOM-   |  |
| . 1  |  |
| 32. PHENOMENA OBSERVED   |  |
| CLOUD COVER AND THE BARTH'S SURPACE 33. MEASUREMENT PANGE  |  |
| 7 TO 8 LEVELS OF GRAY  |  |
| 34. PRECISION AND ACCURACY   |  |
|  |  |

| VIDICON CARBRA SYSTEM   VCSW   A REGUME CONT.]   A RECOMMENDATION   A RECOME   | 46. SPECIAL REQUIREMENTS  46. SPECIAL REQUIREMENTS  47. COMPONENTS  48. SPECIAL REQUIREMENTS  48. SPECIAL REQUIREMENTS  49. CAMPONENTS  40. CA |
|--|--|
| 1. ORGANIZATION  1. GODDARD SPACE FLT CENTER 301-982-5347  1. ILEPHONE  1. ORGANIZATION  1. TELEPHONE  1. TELEPHON | FTER, TAPE RECORDER  Statement of the Control of th |
| TRE AND TRANSHIT PICTURES OF THE EARTH'S CLOUD  TILE P/1.5 LOW-RESOLUTION 0.5-INCH VIDICON UNC  TRESOVER SPECIFIC BY THE EARTH'S CLOUD  TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST  TO CHOOSE  TYPES OVER SPECIFIC AREAS.***SECONDARY-TO TEST  | SALERA TAPE RECORDER    Standard Found   |
| TIGHT<br>TWE<br>TWE<br>TWE<br>TWE<br>TWE<br>TWE<br>TWE<br>TWE<br>TWE<br>TW   | TTER, TAPE RECORDER    Solve Average Fower   Strand Flore   Strand Flore   Strand Flore  |
| IGHT<br>IME<br>IME<br>INC<br>INC<br>INC<br>INC<br>INC<br>INC<br>INC<br>INC<br>INC<br>INC   | 10. NATES CAN BE READ OUT IN 100 SECONDS USING DERAYS AND SERVICES OF AND SERVICES OF AND SERVICES OF AND SERVICES OF OUT OF SERVICES OF SERVIC |
| D D D EST  | FEG. INTERFEGENCE 197. NATERFERENCE IN SALELDING TO SHEEDING INTERFEGENCE 197. NATERFERENCE IN AGGNETIC SHIELDING USED.    OLD DATA RECOVERY   |
| TIME ST. LANE  | ILON DELATED AND REALTIME IRES CAN BE READ OUT IN 1 ERATING AT PREQUENCY OF 2 NG OF CLOUD COVER PATTERN LYSIS THAN PROM MED OR NA EMBNTS IN SAT MET 1958-19  |
| D D EST  | RES CAN BE READ OUT IN 11 ERATING AT PREQUENCY OF 2 GO CLOUD COVER PATTERN YSIS THAN PROM MED OR NATAMON Y N. YER PATTERN YOUR OF 1958-19  |
| U NC<br>D D C  | TURES CAN BE READ OUT IN 100 SECONDS USING DERATING AT FREQUENCY OF 235 MHZ.  INS  INS  INS  OF CLOUD COVER PATTERNS. MORE VALUABLE SALYSIS. THAN PROM MED OR NARROW ANGLE CAMERAS.  TO STANDON U.S. COVER DOLLED OF STAND.  |
| BS F S F   | NES THE STATE OF 235 MHZ.  INS THE OF CLOUD COVER PATTERNS, MORE VALUABLE SALYSIS THAN PROM MED OR NARROW ANGLE CAMERAS.  SVEMENTS IN SAT MET 1958-1964, NASA SP-96.***  |
| ES ES  | NING OF CLOUD COVER PATTERNS, MORE VALUABLE MALYSIS THAN PROM MED OR NARROW ANGLE CAMERAS.  SVEMENTS IN SAT MET 1958-1964, NASA SP-96.***  |
| ES ES  | ALYSIS THAN PROM MED OR NARROW ANGLE CAMERAS  SVEMENTS IN SAT MET 1958-1964, NASA SP-96.***  |
| E S  | SVENENTS IN SAT MET 1958-1964, NASA SP-96.***  |
|  | SYEMENTS IN SAT MET 1958-1964, NASA SP-96,***  |
| CHELLE A COLLECTION  |  |
|  | NAUTICS, V.5, JUNE 1960.***3) MESNER, M.H. AND STANISZEWSKI, J.:   |
|  | CE EXPLOR. ASTRONAUTICS, V.5, MAY 1950. ***  |
| z z  | 4) INSTRUMENTS AND SPACECRAPT, NASA SP-3028, 1966, ***5) DATA<br>AVAILABLE FROM NATIONAL WEATHER RECORDS CTR (ESSA), ASHEVILLE, NC.  |
| FLIGHT, TWO WIDE-ANGLE CAMERAS WERE USED. EACH CONSISTS  | To the state of th |
| OF A 0.5-IN VIDICON TUBE AND A FOCAL-PLANE SHUTTER THAT PERMITS <u>IDENTICAL CAMERA FI</u><br>STORAGE OF STILL PICTURES ON THE TUBE SCREEN. AN BIECTRON BEAM   66 DIAGRAMS   | IDENTICAL CAMERA FLOWN ON TIROS 1-10. SIMILAR CAMERA ON ESSA 1.  |
| CONVERTS THE STORED PICTURES INTO TELEVISION-TYPE ELECTRONIC   |  |
| SIGNALS, WHICH CAN BE TRANSMITTED TO GROUND RECEIVERS ON DEMAND.   |  |
| NETIC TAPE FOR TRANSMISSION AT A LATER TIME, THE CAMERA HAS A  |  |
|  |  |
| SPEED OF<br>500 LINE P   |  |
| CESSED POR STORAGE IN 2 SECS. A MINIMUM INTERVAL OF 10 SEC BE-   |  |
| TWEEN PICTORES IS REQUIRED FOR THE TARGET INAGE TO BE BLECTRI-   | -  |
| SPIN AKES AND IS AUTOMATICALLY TRIGGERED SO AS TO BE IN A PIC-   |  |
| TURE TAKING MODE ONLY WHEN DIRECTED TOWARD THE EARTH, TRANSMIS-  |  |
| SION OF THE ENTIRE REEL OF 32 PICTURES CAN BE ACCOMPLISHED IN  |  |
| .21  |  |
| 23. PHENOMENA OBSERVED   |  |
| CLOUD COVER AND THE BARTH'S SURFACE  |  |
| TO 8 LEVELS OF GRAY  |  |
|  |  |

| INSTRUMENT KESUME NATIONAL AERONAUTICS AND PROPERTION  | 38. SPECTRAL RAIGE  38. SPECTRAL RESOLUTION 39. TIME CONSTANT  38. S |
|--|--|
| CAMBRIDGE, MASSACHUSETTS   | 89.0 DEG   |
|  |  |
| -  | THE CENTER   |
| 11/10/6 9 0004   | 1  |
| INVESTIGATOR 7. ORGANIZATION 8. TELEP  | SPECIAL REQUIREMENTS   |
| ECH MON) GODDARD SPACE PLT CENTER  |  |
| 9. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE  | COMPONENTS   |
| 12 CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. START 16 COMMETTION 17. STATUS  | 2 TV CAMBRAS, 2 TAPE RECORDERS, SYSTEM ELECTRONICS   |
| DATE   | H .  |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 164 156 MAGNETIC 166 NUCLERA 197 THERMAN 168 SHIELDING   |
| . H. L. NASA HDOTRS OSSA/SRO   |  |
| 23. LOCATION   | 60. DATA RECOVERY  |
| ECTRONICS PRINCETON, N.J.  | GRAY-SCALE CALIBRATION DELAYED AND REALTIME DAYSIDE OF ORBIT   |
|  |  |
| IGH-RESOLUTION WIDE-ANGLE 1-INC  | THE AVCS VIDEO SIGNAL HAS A BASEBAND OF 60 KHZ, WITH ITS DATA  |
|  | MADE UP OF DISCRETE FRAMES.  |
| GENERAL EMBY   | PA ADMANTACE AND INVESTIGATION   |
|  | S. AUVANIAGES AND LIMITATIONS  |
| PRIBARY-TO FROVIDE RETECTOROLOGICAL DATA IN THE FORM OF WIDE-ANGLE   |  |
| m  | 64. REFERENCES   |
|  | 1) DESIGN STUDY REPORT FOR THE IMPROVED TOS (ITOS) SYSTEM, V.1-3.  |
|  | 34,JUN 7,68. ***2  |
| 14 Commence of the Commence of | ENGINEERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELECTRONICS DIV.  |
| 3. PHINCIPLES OF OPERATION AS DESCRIPTION OF MILE OFFICE MANAGEMENT  | CONTRACT NO. NASS-9034, MAY S. 196/.**** SSSA PRESS HELEASE FOR  |
| THE AVENTUAL OR TIMES IN IS DESCRIPTED STULLEN TO THE SISTEMS TEST.  | EDDA 3, KD 00004, DEFT. 19, 1900. ***4) DIG. ACHIEV. IN DEACE NDD 1066 NES 00-156 1067   |
|  | ORICAL REMARKS   |
| ONLY 1 IN OPERATION  | SIMILAR TO AVCS ON NIMBUS 1 AND 2. AND ESSA 3 AND 5.   |
| TIME. THE CAMERAS ARE MOUNTED ON THE BASEPLATE OF THE SPACECRAPT   | 66. DIAGHAMS   |
| AND LOOK AT THE NADIR DURING PICTURE-TAKING SEQUENCES. THE LENS  |  |
| IS A TEGER-KINOPTIC, 108 DEG, WIDE-ANGLE, F/1.8, 5.7 MM LENS   |  |
| UDIEG MW ELECTROMEGNETICALLI CONTROLLED DANOTIEM: INE YINION IS<br>A memendity utnitions mentic to prefesoramitative pofficen and many   |  |
| HOLLING ACCORD INTERVIEW IN TO BROWN AND THE CONTROL OF THE CONTRO |  |
| NETTONIA NORTHAL 6.5 SEC PRAME SCAN TIME. A GRAV-SCALF CALIBRA-  |  |
| LY, UTILIZING AN INCANDESCENT LAMP AS A LIGHT  |  |
| PROVIDES 15 LINEAR DENSITY STEPS. THE LIGHT OUTPUT IS DIRECTED   |  |
| THROUGH THE GRAY-SCALE TRANSPARENCY BY MEANS OF A LENS AND PRISM   |  |
| VIDIC  |  |
| A REFERENCE WHEN THE TV PICTURES ARE   |  |
| RE SEVOENCE LASIS ABOUT  |  |
| AND STORED IN A 3-CHAN   |  |
|  |  |
|  |  |
| CLOUD COVER OF EARTH (REPLECTED VISIBLE SOLAR RADIATION)   |  |
| 33. MEASUREMENT HANGE. MARKET ANNOTE AN JOAN OF DOOM TANDEDRE  |  |
| 34. PRECISION AND ACCURACY   |  |
| 833-LINE RESOLUTION. 15-16 LEVELS OF GRAY  |  |
|  |  |

| 2 TO CAMERIA SE STADE RECORDER 11.TANGER DESCRIPTION OF STATE AND CAMERIA SERVICE STATE AND CAMERIA SERVICES STATE SERVICES SERVI | TV CAMBRAS, 2 TAPE RECORDERS, SYSTEM ELECTRONICS   |
|--|--|
| 48. WEIGHT RS. VOLUME  49. ANGEGRT RS. VOLUME  40. STREET REPRESENCE 156. INTERCERENCE 17. INTERCERENCE 18. INTERCENCE 18. INTERCERENCE 18. INTERCENCE 18. INTERCERENCE 18. INTE |  |
| 63 LB  64. INTERFERENCE   St. IN | 48. WEIGHT 48, VOLUME 50, AVERAGE POWER 51, STANDBY POWER 52, PEAK POWER 53.   |
| 64. NTREFRENCE STATE TO SERVICE STATE OF THE LAND STATE OF THE STATE O | LB   |
| Se. CALUBRATION  SERVITIVE  SERVITIVE  OS. CALUBRATION  OS. CALUBRATION  OS. CALUBRATION  OS. TELEMET'S RECOUREMENTS  THE AVCS VIDEO SIGNAL HAS A BASEBAND OP 60 KH  MADE UP OF DISCRETE FRAMES.  SE. ADVANTAGES AND LIMITATIONS  OS. TELEMET'S PECULIANITATIONS  OS. REFERENCES  OS. REPORT FOR THE IMPROVED TOS (I RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, PAY 5, 1967.*****3) ESSA  ENGINEERING REPORT TOS A, VOL 1, 2, 3. RCA ASTRO-CONTRACT NO. NASS-9034, PAY 5, 1966, *****4) SIG. A  APP. 1966, NASA SP-156, 1967.  SENISTORICAL REMARKS  SINILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3  SE. DIAGRAMS  OS. DI | 54. INTERFERENCE 56. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58.  |
| 62. CALUBRATION  62. CALUBRATION  62. TELEWER'S ALTIBRATION  62. TELEWER'S PROUNTEMENTS  THE AVCS VIDEO SIGNAL HAS A BASEBAND OF 60 KH  MADE UP OF DISCRETE FRAMES.  63. REFERENCES  64. REFERENCES  1) DESIGN STUDY REPORT FOR THE IMPROVED TOS (I  RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, RNG ASTRO-CONTRACT NO. NASS-9034, HAY S, 1967,****3) ESSA  ENGINEERING REPORT TOS A, VOL 1, 2, 3. RCA ASTRO-CONTRACT NO. NASS-9034, HAY S, 1966,****4) SIG. AN APP. 1966, NASA SP-156, 1967.  65. HISTORICAL REMARKS  SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3  66. DIAGRAMS  66. DIAGRAMS  COATRACT NO. NASS SP-156, 1967.  66. DIAGRAMS  COATRACT NO. NASS SP-156, 1967.  | ENSITIVE MAGNETIC SHIRLDING  |
| GRAY-SCALE CALIBRATION DELAYED AND REALTINE! DAY  62. TELEMETRY REQUIREMENTS  THE AVCS VIDEO SIGNAL HAS A BASEBAND OF 60 KHZ, W  HADE UP OF DISCRETE FRAMES.  63. ADVANTAGES AND LIMITATIONS  64. ADVANTAGES AND LIMITATIONS  10. ADVANTAGES AND LIMITATIONS  65. ADVANTAGES AND LIMITATIONS  66. ADVANTAGES AND LIMITATIONS  67. ADVANTAGES AND LIMITATIONS  68. ADVANTAGES AND LIMITATIONS  69. HISTORICAL MASA SP-156, 1967.  69. HISTORICAL MEMARKS  SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND  68. DIAGRAMS  68. DIAGRAMS   | CALIBRATION 60 DATA RECOVERY   |
| 62. TELEMETRY REQUIREMENTS THE AVCS VIDEO SIGNAL HAS A BASEBAND OF 60 KHZ, WADE UP OF DISCRETE FRAMES.  63. ADVANTAGES AND LIMITATIONS  1) DESIGN STUDY REPORT FOR THE IMPROVED TOS (ITOS) RCA ASTRO-ELECTRONICS, CONTRACT NO. NAS5-9034, JUN ENGINEERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELECTRONICS, CONTRACT NO. NAS5-9034, MAY 5, 1967.****3) ESSA ASTRO-ELECTRONICS, CONTRACT NO. NAS5-9034, MAY 5, 1967.****4) SIG. ACHIE BSSA 3, RS 66054, SEPT. 19, 1966.****4) SIG. ACHIE 65, HISTORICAL REMARKS SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 65. DIAGRAMS  65. DIAGRAMS  | TION DELAYED AND REALTIME DAYSIDE OF   |
| THE AVCS VIDEO SIGNAL HAS A BASEBAND OF 60 KHZ, WADE UP OF DISCRETE FRAMES.  62. ADVANTAGES AND LIMITATIONS  63. ADVANTAGES AND LIMITATIONS  64. ADSTROUGH REPORT FOR THE IMPROVED TOS (ITOS) RCA ASTROUGH REPORT TOS A, VOL 1,2,3. RCA ASTROUGH RENG REPORT TOS A, VOL 1,2,3. RCA ASTROUGH RESS A 3, RS 66054, SEPT. 19, 1965.***41) SIG. ACHIE RPP. 1966, NASA SP-156, 1967.  65. HISTORICAL RENARKS  SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 65. DIAGRAMS   |  |
| 63. ADVANTAGES AND LIMITATIONS 64. REFERENCES 7) DES IGN STUDY REPORT FOR THE IMPROVED TOS (ITOS) RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUN ENGINEERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELE CONTRACT NO. NASS-9034, MAY 5,1967.***3) ESSA PRE ESSA 3, RS 66054, SEPT. 19, 1965.***44) SIG. ACHIE APP. 1966, NASA SP-156, 1967. 65. HISTORICAL REMARKS SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 66. DIAGRAMS   | AVCS VIDEO SIGNAL HAS A BASEBAND OF 60 KHZ, WITH ITS   |
| 63. ADVANTAGES AND LIMITATIONS  64. REFERENCES  1) DESIGN STUDY BEPORT FOR THE IMPROVED TOS (ITOS)  RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUN  ENGINEERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELE  CONTRACT NO. NASS-9034, MAY 5,1967.************************************  | UP OF DISCRETE FRAMES  |
| 1) DESIGN STUDY REPORT FOR THE IMPROVED TOS (ITOS) RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUN ENGINERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELE CONTRACT NO. NASS-9034, MAY 5,1967.***3) ESSA PRE ESSA 3, ES 6054, SEPT. 19, 1965.***4) SIG. ACHIE APP. 1966, NASA SP-156, 1967. 65. HISTORICAL REMARKS SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 66. DIAGRAMS   |  |
| 1) DESIGN STUDY BEPORT FOR THE IMPROVED TOS (ITOS) RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUN ENGINEERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELE CONTRACT NO. NASS-9034, MAY 5,1967.************************************   | 27   |
| 1) DESIGN STUDY REPORT FOR THE IMPROVED TOS (ITOS) RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUN ENGINEERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELE CONTRACT NO. NASS-9034, MAY 5,1967.****3) ESSA PRE ESSA 3, RS GOS SEPT. 19, 1966.****4) SIG. ACHIE APP. 1966. NASA SP-156, 1967.  65. HISTORICAL REMARKS  65. DIAGRAMS  66. DIAGRAMS  66. DIAGRAMS  66. DIAGRAMS  67. DIAGRAMS  68. DIAGRAMS  68. DIAGRAMS  69. DIAGRAMS  69. DIAGRAMS  69. DIAGRAMS  60. DIAGRAMS  60. DIAGRAMS  60. DIAGRAMS  61. DIAGRAMS  62. DIAGRAMS  63. DIAGRAMS  64. DIAGRAMS  65. DIAGRAMS  66. DIAGRAMS  66. DIAGRAMS  67. DIAGRAMS  68. DIAGRAMS  68. DIAGRAMS  69. |  |
| RCA ASTGO STUDI MEDGIT FOR THE INFRUVED TOS (1705) RCA ASTGO-ELECTRONICS, CONTRACT NO. NASS-9034, JUN ENGINEERING REPORT TOS A, VOL 1, 2,3. RCA ASTRO-ELE CONTRACT NO. NASS-9034, MAY 5,1967.***3) ESSA PRE ESSA 3, R.S. 66054, SEPT. 19, 1966.***4, SIG. ACHIE APP. 1966. MASA SP-156, 1967.  SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND  GE. DIAGRAMS.  | NOTICE OF THE PROPERTY OF THE  |
| RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUN ENGINEERING REPORT TOS A, VOL 1,2,3. RCA ASTRO-ELE CONTRACT NO. NASS-9034, MAY 5,1967.***4) SIG. ACHIE APP. 1966. NASA SPPT. 19, 1966.***4) SIG. ACHIE APP. 1966. NASA SPPT. 19, 1966.***4) SIG. ACHIE SPRTICAL REWARKS SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 6s. DIAGRAMS  | SIGN STUDY REPORT FOR THE IMPROVED TUS (ITUS)  |
| CONTRACT NO. NAS-9034, NAY 5,1967.***4) ESSA PRESS RELEGIONS BESSA 3, ES 66054, SEPT. 19, 1966.***4) SIG. ACHIEV. IN SPACE APP. 1966. NASA SP-156, 1967.  6.8 HISTORICAL REMARKS  SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 5.  6.8. DIAGRAMS  SILILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 5.  | ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034,JUN  |
| ESSA 3, ES 66054, SEPT. 19, 1966.***4) SIG. ACHIEV. IN SPACE  APP. 1966, NASA SP-156, 1967.  65. HISTORICAL REMARKS  SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 5.  65. DIAGRAMS  65. DIAGRAMS  | ANY C. 1067 HAMS, PORS DEFOUNDING DETENDED BY  |
| APP. 1966, NASA SP-156, 1967.  65 HISTORICAL REMARKS  66 DIAGRAMS  66 DIAGRAMS  67 DIAGRAMS  68 DIAGRAMS  69 DIAGRAMS  60 DIAGRAMS  60 DIAGRAMS  60 DIAGRAMS  60 DIAGRAMS  61 DIAGRAMS  62 DIAGRAMS  63 DIAGRAMS  64 DIAGRAMS  65 DIAGRAMS  66 DIAGRAMS  66 DIAGRAMS  67 DIAGRAMS  68 DIAGRAMS  69 DIAGRAMS  69 DIAGRAMS  60 DIAGRAMS  60 DIAGRAMS  60 DIAGRAMS  60 DIAGRAMS  61 DIAGRAMS  62 DIAGRAMS  63 DIAGRAMS  64 DIAGRAMS  65 DIAGRAMS  66 DIAGRAMS  67 DIAGRAMS  68 DIAGRAMS  69 DIAGRAMS  69 DIAGRAMS  60 DIAGRAMS  61 DIAGRAMS  62 DIAGRAMS  63 DIAGRAMS  64 DIAGRAMS  65 DIAGRAMS  66 DIAGRAMS  66 DIAGRAMS  67 DIAGRAMS  68 DIAGRAMS  69 DIAGRAMS  60  | ANDLE TOT TROUGH AND TOTAL OF THE TOTAL OF THE ODER THE TOTAL OF THE ODER A PRINT OF THE ODER OF THE O |
| 65. DIGGRAMS  65. DIGGRAMS  65. DIGGRAMS  66. DIGGRAMS  67. DIGGRAMS  68. DIGGRAMS   | E35# 5# E3 00034# 3E61.   300.4744 310. ACHIES.  |
| SIMILAR TO AVCS ON NIMBUS 1 AND 2, AND ESSA 3 AND 66. DIAGRAMS   | 65, HISTORICAL REMARKS   |
| 66. DIAGRAMS  68. DIAGRAMS  69. DIAGRAMS   | CTATTA TO AUC ON NTREDIC 1 AND 2 AND DECK 2 AND  |
|  | 66. DIAGRAMS   |
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|                                       | INSTRUMENT RESUME  | 35. SPECTRAL      |
|---------------------------------------|--|-------------------|
| NATIO                                 | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER | 38. FIELD OF V    |
| !                                     | CAMBRIDGE, MASSACHUSETTS   | 0.68              |
| 1, TITLE                              | 2. ACRONYM 3. EXP NO   | 40.ANGULAR RES    |
| AUTOMATIC PICTURE-TRANSMISSION SYSTEM |  | 0.25              |
| (TITLE CONT.)                         | 4. RESUME 5. ULMSION   | 42, POINTING ACCU |
|                                       | 11/10/69 0004  |                   |
| 6. PRINCIPAL INVESTIGATOR             | 7. ORGANIZATION B. TELEPHONE   | 46. SPECIAL RE    |
| OBRIEN J. (TECH MON)                  | GODDARD SPACE PLT CENTER 301-982-5348  |                   |
| 9. CO-INVESTIGATOR                    | 10. ORGANIZATION 11. TELEPHONE   | 47. COMPONEN      |
|                                       |  | CAMERAS           |
| 12. CONTHACT 13. CONTHACT NUMBER      | BER 14. FLASH INDEX NUMBER 15. START 16. COMPLETION 17. STATUS               | 48. WEIGHT        |
|                                       | INTEGRATION  | 45 LB             |
| 18. MONITOR                           | 19. AGENCY 20.PGM OFFICE 21. TELEPHONE                                       | S4. INTERFEREN    |
| GARBACZ, M.L.                         | NASA HDOTRS 0SSA/SRO 202-963-429   | SENSITIV          |
| 22. VENDOR                            | 23 LOCATION  | 59. CALIBRATI     |
| RCA ASTRO-ELECTRONICS                 | PRINCETON, N.J.  |                   |
| 26. INSTRUMENT TYPE                   | 11,<br>SECUATY   | 62. TELEMETA      |
| IMAGER, 1-INCH AUTON                  | IMAGER, 1-INCH AUTOMATIC-PICTURE-TRANSMISSION VIDICON                        | THE VIDE          |
| 28. APPLICATION                       | 29. SPACECHAFT   | WHOSE AM          |
| RET                                   | TIROS M  | MODULATE          |
| 30. PURPOSE                           |  | 63. ADVANTAC      |
| PRIMARY-TO PROVIDE M                  | PRIMARY-TO PROVIDE METEOROLOGISTS WITH DAYTIME OBSERVATIONS OF               | AN IMPRO          |
| CLOUD COVER AS DETEC                  | CLOUD COVER AS DETECTED IN THE VISIBLE SPECTRUM FOR DIRECT                   | ON THIS           |
| TRANSMISSION TO USER                  | TRANSMISSION TO USERS LOCATED AROUND THE WORLD. ***SECONDARY-TO              | 64. REFERENC      |
| EXPAND THE OPERATION                  | EXPAND THE OPERATIONAL CAPABILITY OF THE BASIC TOS SYSTEM.                   | 1) DESIGN         |
|                                       |  | BEUK VLG          |

| 31. PRINCIPLES OF OPERATION  | æ   |
|--|-----|
| THE APT CAMERA SUBSISTEM HAS ALSO BEEN PLOWN PREVIOUSLY ON TIROS   | NAN |
| 8, NIMBUS 1,2, AND ESSA 2, 4,6 IN SIMILAR CONFIGURATION. THE TIROS | 0   |
| M SUBSYSTEM WILL CONSIST OF 2 IDENTICAL 1-INCH VIDICON APT CAM-    | 65. |
| ERAS, EACH UTILIZING A TEGRA-KINOPTIC, 108-DEG, WIDE-ANGLE, P/1.8  |     |
| OBJECTIVE LENS WITH A POCAL LENGTH OF 5.7 MM. ONLY ONE CAMERA IS   | 99  |
| UTILIZED FOR OPERATION DURING ANY PICTURE-TAKING SEQUENCE. THE     |     |
| APT SUBSYSTEM IS CONTROLLED BY GROUND-INITIATED COMMANDS THAT      |     |
| ARE TRANSMITTED TO AND STORED BY THE SATELLITE, ONCE THE SEQUENCE  |     |
| IS INITIATED, THE CAMERA WILL TAKE A PICTURE ONCE EVERY 260 SEC    |     |
| DATIL THE PRESCRIBED 11 PICTURES HAVE BEEN TAKEN. THE ACTUAL       |     |
| PICTURE TAKING REQUIRES 8 SEC WITH AN EXPOSURE TIME OF 25 MILLI-   |     |
| SEC, AND THE TRANSMISSION 150. SECS. DURING THIS LATTER PERIOD     |     |
| THE VIDICON IS SCANNED AT 4 LINES PER SEC, AND THE SIGNALS         |     |
| TRANSMITTED PRODUCING AN 600-LINE PICTURE WITH SCAN LINES PER-     |     |
| PENDICULAR TO THE ORBIT TRACK. TWO 5-WATT TV TRANSMITTERS ARE      |     |
| USED, EACH PROVIDING A 137.62 MHZ CARRIER. AN APT GROUND STATION   |     |
| WITH AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RE-      |     |
| CRIVE THESE PICTURES WHEN THE SPACECRAFT IS WITHIN ACQUISITION     |     |
| RANGE.   |     |

| 66. DIAGRAMS   |  |   |   |   |   |  |   |  |   |  |        |                        |   |                               |                            |  |  |
|--|--|---|---|---|---|--|---|--|---|--|--------|------------------------|---|-------------------------------|----------------------------|--|--|
| OBJECTIVE LENS WITH A POCAL LENGTH OF 5.7 MM. ONLY ONE CAMERA IS | UTILIZED FOR OPERATION DURING ANY PICTURE-TAKING SEQUENCE. THE | ARE TRANSMITTED TO AND STORED BY THE SATELLITE, OUTBANDS THAT | IS INITIATED, THE CAMERA WILL TAKE A PICTURE ONCE EVERY 260 SEC | UNTIL THE PRESCRIBED 11 PICTURES HAVE BEEN TAKEN. THE ACTUAL PICTURE TAKING REQUIRES 8 SEC WITH AN EXPOSURE TIME OF 25 MILLI- | SEC, AND THE TRANSMISSION 150, SECS. DURING THIS LATTER PERIOD THE VIDICON IS SCANNED AT 4 LINES DER SEC. AND THE SIGNALS | TRANSMITTED PRODUCING AN 600-LINE PICTURE WITH SCAN LINES PER- | PENDICULAR TO THE ORBIT TRACK. TWO 5-WATT TV TRANSMITTERS ARE | USED, EACH PROVIDING A 137.62 MHZ CARRIER, AN APT GROUND STATION | WITH AN APPROPRIATE ANTENNA, RECEIVER, AND A RECORDER CAN RE- | CEIVE THESE PICTURES WHEN THE SPACECRAPT IS WITHIN ACQUISITION | RANGE. | 32. PHENOMENA OBSERVED | CLOUD AND TERRAIN FEATURES OF APPROX 3.4 NM OR LARGER | DYNAMIC PICTURE RANGE OF 20:1 | 34. PRECISION AND ACCURACY | S/N OF 32 DB, MINIMUM: 8 GRAF LEVELS CAN BR RESOLVED |  |

| Γ        | 38. SPECTRAL RAMGE 39. TIME CONSTANT   |
|----------|--|
|          | 0.45 TO 0.65   |
|          | D OF VIEW 39. GROUND SWATH   |
| NO<br>NO | 100/1. SPATIAL RESOLUTION  |
|          | 0.25 DEG 3.4 NM PER TV-LINE AT CENTER PROM 750 NM ALTITUDE   |
| 100      | MED CIRCULAR   |
| П        | 40. SPELIAL HEUUI NEWENTS  |
|          | 47. COMPONENTS   |
| T        | CAMERAS (2), ELECTRONICS (2) 48. WEIGHT 49. VOLUME 10. AVERAGE POWER 10. STANDBY POWER 152. PEAK POWER 153. MTBF   |
| NO       | B S MAGNETIC LES NUCLEAR S PRERMAL S CULTER COLOR COLO |
| T        | SEN STOTVE   |
| ш        | 80. DATA RECOVERY  |
| 7        | REALTINE TELEMETRY DAYTIME ON COMMAND  |
| NC I     | TURN-ON, AND PHASING CODE DRIVE  |
| П        | E AMPLITUDE MODULATES THE 2400 HZ SUBCARRIER, WH   |
| T        | RODULATES THE 137.62 BHZ CARRIER.  |
| Τ        | LADED, SOLENOID-ACTUATED SHUTTER WILL E  |
|          | ON THIS APT. REVISED TIMING TO PROVIDE 11 PICTURES PROM 1 CAMERA 84. REFERENCES  |
|          | STUDY REPORT POR T   |
|          | ASTRO-ELECTRONICS C  |
| Τ        | NA.  |
| 308      | TN D-1915, NOV. 1963.*   |
| 1 CS     | UT-Z, KCA CORP., MAY, 1967.<br>65. HISTORICAL REMARKS  |
| 8.       |  |
| IS       | 66. DIAGRAMS   |
| 61       |  |
| SCE      |  |
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| 1        |  |
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| NO       |  |
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| INSTRUMENT RESUME   | 35. SPECTRAL RANGE 35. SPECTRAL RESOLUTION 37. TIME CONSTANT   |
|---|--|
|   | 38. FIELD OF VIEW 38. GROUND SWATH CATON NAV PROM 500 NM ATT   |
| 1. TITLE 2. ACRONYM 3. EXPINO   | JLAR RESOLUTION 41. SPATIAL RESOLUTION   |
| TE RADIOMETER FPR   |  |
| (TITLE CONT.) 4 PESUME 5. VERSION 11/1/ / C 0 0 0 0 0 0   | 42 POINTING ACCURACY 43, POINTING RATE 44, ALTITUDE 45, INCLINATION  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE  | CTUCOPHU SON SINCH   |
| PARENT, DR. R.J. UNIVERSITY OF WISCONSIN 608-262-0724 S. COLINVESTIGATOR 10. ORGANIZATION                                 | 47. COMPONENTS   |
| NTRACT NUMBER 14. FLASH INDEX NUMBER 19. START  | 4 SENSORS (THERMISTORS), BLECTRONICS 48. WEIGHT 49. VOLUME SOLVEN SOLVEN STANDBY POWER 52. PEAK POWER STANDBY POWER 52. PEAK POWER 54. WEIGHT 69. VOLUME |
|   | AT THERMAI   |
| IS MONITOR TO PER NASA HOOTRS OSSA/SRO 202-963-4291   | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 88. SHIELDING SENSITIVE PER THERMALLY ISOLATED  |
| İ   |  |
| UNIVERSITY OF WISCONSIN MADISON, WISCONSIN NA 20. INSTRUMENT TYPE   | VIEW OF HOUSING DELAYED TELEMETRY CONTINUOUS 62. TELEMETRY REQUIREMENTS  |
| FOUR IR/VISIBLE LOW-RESOLUTION THERMISTOR   | E ONE PPR FRAME OF DATA, 8 BITS TO THE WO  |
| 200   | 32 SECONDS.  |
|   | 63. ADVANTAGES AND LIMITATIONS   |
| 97 T  |  |
|   | 64. REFERENCES   |
| REFLECTION AND SCATTERING OF SOLAR RADIATION BY THE EARTH-ATMOSPHERE SYSTEM.  | 1) DESIGN STUDY REPORT FOR THE IMPROVED TOS(ITOS) SYSTEM, V.1.2. RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUNE 7, 1968.**                          |
| 31. PRINCIPLES OF OPERATION   | Z) KUBIN, L.: OFERATIONAL PROCESSING OF LOW RESOLUTION IN (LELY)<br>DATA PROM ESSA SATELLITES, ESSA TECH REPORT NESC+42, PEB. 1968.                      |
| THE ITOS FLAT PLATE RADIOMETER (FPR), WILL ALSO BE FLOWN ON ITOS  |  |
|   | 65. HISTORICAL REMARKS   |
| MOUNTED ON THE BACK SURFACE. THE HOUSING TEMPERATURES ARE SEPARAMENTY SRINSED AND RECORDED. THERE ARE 2 DAIRS OF SENSORS. | THIS FPR IS SIMILAR TO THOSE PLOWN ON ESSA 3, 5, 7, AND 9.   |
|   |  |
| ALUMINUM. THE BLACK PAINTED SURFACE WILL RESPOND TO THE SUM OF THE PERFORMENT TO THE SUM OF                               |  |
| _   |  |
| VISIBLE RANGE BUT ARE BLACK TO IR BEYOND 7 MICRONS. THESE   |  |
| ABSORB THE MENADIATED ENERGIFROM THE EARTH AND EXCLUDE TO A HIGH DEGREE THE DIRECT AND REFLECTED SOLAR RADIATION. ONE     |  |
| HHITE PAIR WILL OPERATE AS RADIATIVE ROUILIBRIUM DE   |  |
| R TO ESSA. THE 2ND PAIR IS OF A NEW THERMAL   |  |
| BACK DESIGN. THE ENERGI REQUIRED TO MAINTAIN A CONSTANT TERPERT.  |  |
| SCANNING RADIOMETERS AND TE 180 DEGREES FOR ALL   |  |
|   | •  |
| 32. PHENOMENA OBSERVED  |  |
| ENERGY RADIATED PROM AND REPLECTED BY THE EARTH-ATMOSPHERE 33. MEASUREMENT RANGE  |  |
|   |  |
| 34, PRECISION AND ACCURACY  |  |
|   |  |

|  | 36 SPECTRA: BALICE   |
|--|--|
| TOTAL STANDARD OF STANDARD STA | O 12.5 MICRONS   |
| ELECTRONICS RESEARCH CENTER  | EW 39. GROUND SWATH  |
| CAMBRIDGE, MASSACHUSETTS   | 150.0 DEG LIMB-TO-LIMB (4100 NM) FROM 750 NM ALT   |
| I, TITLE Z.ACHONYM 3. EXPNO  | 49. ANGULAR RESOLUTION 41. SPATIAL RESOLUTION  |
| RADIOMETER   | TUDE   |
| (TITLE CONT.)  | 44. ALTITUDE 45. INCLINATION   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL REQUIREMENTS:  |
| HON) GODDARD SPACE FLT CENTER  | RADIOMETERS MUST BE ABLE TO SCAN 150 DEG WITHOUT OBSTRUCTIONS  |
| 8. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE  | 47. COMPONENTS   |
| IN CONTRACT (12 DOWNEROW) IN STANDARD IN S | A WEIGHT AND THE RECORDING SYSTEMS, PROCESSOR, TAPE RECORDER   |
| TEAST NOMBER 1. TEAST NOEN NOMBER 1. DATE  | TO TO TO TO THE CAME OF THE CA |
| 18. MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 58. SHIELDING   |
| M.L. NASA H DOTRS OSSA / SRO   | SENSITIVE  |
| 23 LOCATION  | 59. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION   |
| A RES CENTER GOLETA, CALIP   | 2 COLD, 1 HOT EACH SCAN DELAYED AND REALTIME NIGHTIME/DAYTIME  |
|  |  |
| 28 ABBLOATION  | BASEBAND BANDWIDTH IS 7.2 KHZ.   |
| CTATAC SANC  |  |
| OSE  | 63. ADVANTAGES AND LIMITATIONS   |
| N  | HIGHER CALIBRATION ACCURACY IN VISIBLE THAN PRESENT CAMERAS, NOT   |
| 8  | SUBJECT TO SHADING. PROVIDES DAY AND NIGHT REALTIME IR DATA.   |
| PERMITS DE   | 64. REFERENCES   |
| TEMPERATURE OF THE GROUND, SEA, OR CLOUD TOPS THAT ARE VIEWED BY   | 1) DESIGN STUDY REPORT FOR THE IMPROVED TOS (ITOS) SYSTEM, V. 1, 2, 3.   |
| THE REDIONETER.  | RCA ASTRO-ELECTRONICS, CONTRACT NO. NASS-9034, JUNE 7,68.***2)   |
| 3), PRINCIPLES OF OPERATION  | COLDEREG. 1. BETECKOLOGICAL IN INSTRUMENTS FOR SATELLIES, PRE-   |
| MOSOAS GENORO  | SENIED AT 1311 ANNUAL IECH. SINE OF SOCIETI OF FROID-OFILCAL THE MERMENHAMMENT BUCTHREDE 111 73 1060   |
| CONSISTS OF 2  | INDIRURENTALION ENGINEERS, AUG. 22, 1900.  |
|  | 65. HISTORICAL REMARKS   |
| AN THREE MEDITE TO DO DO DESCRIPTION OF THE CONTRACTOR THE THE CONTRACTOR THE THE CONTRACTOR THE THE CONTRACTOR THE THE THE THE THE THE THE THE THE THE  | SCHAPHITED BOD TAINCH IN 1070  |
| ZON. PERPENDICULA!   | 66. DIAGRAMS   |
|  |  |
| WHICH IS INCLINED 45 DEG TO ITS AXIS OF ROTATION. THE IR CHAN-   |  |
| NEL IS CALIBRATED AT THE COLD EXTREME BY MEASURING THE RESPONSE  |  |
| TO OUTER SPACE AND ON THE WARM SIDE BY MEASURING THE IR RADIA-   |  |
| 2  |  |
| THE BOSESSIED SEFEREIELS. IN OPERATION, RADIATION REFLECTS FROM  |  |
|  |  |
| ROUGH AND IS MEASURED BY   |  |
| SOLID-STATE RADIANT ENERGY DETECTOR (THERMISTOR BOLONETER). THE  |  |
| -  |  |
| A U.SZ-U. / S DICKON MAYKEENGTH FILTER ONTO A PHOTOVOLIALC SILICON   |  |
| COMPATIBLE WITH THE APT SYSTEM PRODUCING A DIRECT READOUT IR   |  |
|  |  |
|  |  |
| ENERGY IN THE INFRARED AND VISIBLE REGION OF THE SPECTRUM<br>33. MASSINEMENT RANGE   |  |
| STATES BETGERENES. 20-8500 PT-IMMEDIA. ID TOWD: 185-320 DPC V  |  |
| ZV-0300 I I BREDERIA IN LERE. 107-330 ELE  |  |
| 1.0 K DEG AT 300 DEG K: 4.0 K DEG AT 185 DEG K   |  |

|  | INCTORACEAT OCCUME  |                             | 35. SPECTRAL BAUGE                  |
|--|---|-----------------------------|-------------------------------------|
| ANOITAN                                  | IN STRUMENT RESUME  |                             | NA                                  |
|  | ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS   |                             | 38. FIELD OF VIEW 39. GR            |
| 1. TITLE                                 |   | 2. ACRONYM 3. EXP NO        | IGULAR RESOLUTION 41. SPATIAL RESOL |
| SOLAR-PROTON GONITOR                     |   | -[                          |                                     |
| (1) TE CON!                              |   | 11/10/69 0005               | NA                                  |
| 6. PRINCIPAL INVESTIGATOR 7.             | 7. ORGANIZATION 8. T  | 8. TELEPHONE                | 46. SPECIAL REQUIREMENTS            |
| 0  | SICS LAB  | 301-776-7100                | DETECTORS SHOULD BE MAINTA          |
|  |   | 11. TELEPHONE               | 47. COMPONENTS                      |
| IZ CONTRACT 13. CONTRACT NUMBER          | JODARD SPACE PLT CENTER   | 301-982-5808                | DETECTORS, AMPLIFTERS, AND          |
| ES-86-6                                  | 11/66   | INTEGRATION                 | I.d.                                |
| 18. MONITOR                              | AGENCY 20.PGM   | ELEPHONE                    | RENCE 55. INTERFEREN                |
| JLO, J.                                  | ESSA/NESC   | FLIGHT 1 CAR TIME           | S                                   |
| APPLIED PHYSICS LAR                      | STLVER SPRING MARVIAND  |                             | PRF-PITCHT CALTRAATTON D            |
| 26. INSTRUMENT TYPE                      | 1   |                             | Ì                                   |
| COUNTER, SOLID-STATE DETECTOR-ARRAY      |   |                             | ES 20                               |
| 28. APPLICATION                          | 29. SPACECRAFT  | ±.                          | WHICH CORRESPONDS TO 15 BI          |
| PART-FLD                                 | TIROS   |                             | 63. ADVANTAGES AND IMITATIONS       |
| PRIMARY-TO DETECT SOLA                   | ER  | PERIOD OF TIME              | WITH REAL TIME TELEMETRY E          |
| IN. THE VICINITY OF THE BARTH POR:       | E BARTH POR: 1. EARLY WARNI   | EARLY WARNING OF THE OCCUR- | PROTON INTENSITY COULD BE           |
| RENCE OF SOLAB-PROTON                    | RENCE OF SOLAR-PROTON EVENTS; 2. SYSTEMATIC MONITORING OF PRO-  | TORING OF PRO-              | 64. REPENCES                        |
| TOW LNIENSITIES AND SPECTER;<br>PHYSTCS. | PECTER; 5. RESERRCH IN SOLAH-TERRESTRIAL  | K-TERRESTRIAL               | MONITOR FOR TIRDS OPERATION         |
| •  |   |                             |                                     |
| 31. PRINCIPLES OF OPERATION              |   |                             | ASTRO-ELECTRONICS, CONTRACT         |
| THE SPH CONSISTS OF 6                    | THE SPH CONSISTS OF 6 SOLID STATE DETECTORS, DETECTORS 1,2,3 8  | ECTORS 1,2,3 8 6            |                                     |
| NEERLY PARALLEL TO THE                   | ARE NOUBLED ON INE SPACECHART SO THAT THE AXES OF THE FOUNCE.<br>Bearly parallel to the earth's magnetic field near the magneti | AR THE MAGNETIC             | 65. HISTORICAL REMARKS              |
| POLES. DETECTORS 4 AND                   | POLES. DETECTORS 4 AND 5 ARE MOUNTED SUCH THAT THE AXES OF THEIR  | HE AKES OF THEIR            | SCHEDULED FOR LAUNCH EARLY          |
| POV ARE APPROXIMATELY                    | POV ARE APPROXIMATELY PERPENDICULAR TO THE BARTH'S MAGNETIC   | S MAGNETIC                  | 66. DIAGRAMS                        |
| FIELD EVERYWHERE, DETE                   | PIZIO BVERVETERE, DETECTORS 1 AND 2 ARE SHIELDED BY HEMISPHERES,  | BY HEMISPHERES,             |                                     |
| REACHING THE DETECTOR.                   | n DETECTOR 1 IS SENSITIVE TO  | O PROTONS ABOVE             |                                     |
| 60 MEV, AND DETECTOR 2                   | 60 MEV, AND DETECTOR 2 IS SENSITIVE TO PROTONS ABOVE 30 MEV.  | BOVE 30 MEV.                |                                     |
| DETECTOR 3 IS SENSITIVE                  | DETECTOR 3 IS SENSITIVE TO PROTONS ABOVE 10 MEV AND CONSISTS  | AND CONSISTS OF             |                                     |
| A LITHIOR-DRIFTED SOLI                   | LITHIUM-DRIFTED SOLID-STATE CUBE-SHAPED DETECTOR SURROUNDED   | OR SURROUNDED BY            |                                     |
| 2 PI STERADIANS. DETEC                   | 2 PI STERADIANS. DETECTORS 5 AND 6 EACH EMPLOY 2 DISK-SHAPED  | DISK-SHAPED                 |                                     |
| DETECTORS OF THE FULLY-DEPLETED,         | Y-DEPLETED, SURPACE-BARRIER TYPE, AND   | TYPE, AND                   |                                     |
| MEASURE PROTON ENERGIE                   | MEASURE PROTON ENERGIES BETWEEN 0.3 AND 10 MEV. EACH HAS A  | EACH HAS A                  |                                     |
| COUNTY RIECTRONS AROVE                   | FOU OF 40 DEGREES, DETECTOR 4, WITH A FOVOR 15  | A 700 MICRON-THICK          |                                     |
| SURFACE-BARRIER DETECTOR.                | TOR. EACH DETECTOR HAS A PR   | PREAMPLIFIER-               |                                     |
| AMPLIPIER-DISCRIMINATOR UNIT ASSOCIATED  | OR UNIT ASSOCIATED WITH IT.   | •                           |                                     |
| 32. PHENOMENA OBSERVED                   |   |                             |                                     |
| SOLAR PROTONS AND ALPH                   | SOLAR PROTONS AND ALPHA-PARTICLES OVER THE POLAR CAPS   | CAPS                        |                                     |
| CONTRACTOR ST                            |   |                             | -                                   |
| 34. PRECISION AND ACCURACY               |   |                             |                                     |
| SEE ITER 31                              |   |                             |                                     |
|  |   |                             |                                     |

|                | 38. SPECTRAL RANGE                     |                  | 36 SPECTRAL RESOLUTION   | TION 37. TIME CONSTANT                  |
|----------------|--|------------------|--|---|
|                | NA<br>Section 20 Section 1             | 1000             | d Z  |   |
|                | SER TERM 31                            | SS. GROUND SWATH | SWATH  |   |
| 9              | LUTION                                 | CUTION           |  |   |
| 1              | г                                      |                  |  |   |
| νοις<br>υ      | NA                                     |                  | MED CIPCHIAD DOLAD   | DOT A D NA                              |
| 2]             | 46. SPECIAL REQUIREMENTS               |                  | CERCULAR   |   |
| П              | BE                                     | MAINTAINED       | D BETWEEN -25 AND  | ) +25 DEGREES C.                        |
| T              | - 1                                    |                  |  |   |
| Т              | DETECTORS, AMPLIFTERS,                 |                  | AND DISCRIMINATORS   | PEAK POWER 53. MTRE                     |
| ~              | .B 0.1 CU                              | PT 2 WATTS       | WATTS  |   |
|                |  | NCTTTV           | S. INTERFERENCE 57. INTERFERENCE 58. SHIELDING                             | DING                                    |
| П              | 59. CALIBRATION                        |                  |  | 61. FREQUENCY OF OBSERVATION            |
| Ţ              | PRE-PLIGHT CALIBRATION                 |                  | DELAYED AND REALTIME CONTINUOUS  | CONTINUOUS                              |
| Ų              | DATA FRAME COMPRISES 2                 | O NINE-          | BIT WORDS. PRAME   | rs 12 SECS                              |
| П              | WHICH CORRESPONDS TO 15 B              | S BITS/SEC.      | SEC. A DIGITAL ENCODER   | ASSIM                                   |
|                | 63. ADVANTAGES AND LIMITATIONS         | TON.             |  |   |
| <b></b>        | WITH REAL TIME TELEMETRY               | RY EARLY         | 3 OF   | INCREASE IN SOLAR                       |
| Į.             | PROTON INTENSITY COULD BE TRANSMITTED. | BE TRA           | NSMITTED.  |   |
|                |  | 1 1 1 1 1 1      |  | 4 4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 |
|                | MONITOR FOR TIROS OPERATIONAL          | ATIONAL          | D WILLIAMS, D.J.: PROPOSAL FOR SOLAR PERATIONAL SAT. APPLIED PHYS LAB, AND | FOR SULAR PROTON                        |
| -7             | STUDY                                  | ORT FOR          | THE ITOS SYSTEM,   |   |
| 7.             |  | TRACT            | O. NAS 5-9034, 19  | 168.                                    |
|                |  |                  |  |   |
|                | 65. HISTORICAL REMARKS                 |                  |  |   |
| E              | D FOR LAUNCH                           | EARLY IN         | 1970.  |   |
| _              | 66. DIAGRAMS                           |                  |  |   |
|                | ************************************** |                  |  |   |
|                | •                                      |                  |  |   |
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|                |  |                  |  |   |

PART 2

APOLLO APPLICATIONS (PROPOSALS ONLY)

| TALISTA LIATANI  | 35. SPECTRAL RANGE 37. TIME CONSTANT  |
|--|---|
|  | 12 CHELLOCK TO 0.7 NICRON NA  |
| CAMBRIDGE, MASSACHUSETTS   | 96.0 BY 96.0 DEG  |
| 2. ACRONYM   | 40. ANGULAR HESOLUTION 41. SPATIAL RESOLUTION                                     |
| DAY/NIGHT CAMERA SYSTEM  | 23 SOURTHOUSE AND THE ROW 140 NM ALTITUDE AS INCLINETION                          |
| 11/10/69   | 0.2 DEG/SEC LOW CIRCHLAR MI   |
| 8. TELEP   | AL REQUIREMENTS   |
| GODDARD SPACE PLT CENTER   |   |
| TOR  | 4). COMPONENTS  |
| USTRUM H. 19 CONTRACT NUMBER 12. FLASH INDEX NUMBER 18. STATT 16 CONTRACT 19. CONTRACT 19. CONTRACT NUMBER 18. STATT   | 48. WEIGHT 19. VOLUME 53. AVERAGE POWER 51. STANDSY FOWER 52. PEAK POWER 53. MTBF |
| AN AN  | 55 LB 1.6 CU PT 23 WATTS 8 WATTS 57 WATTS   |
| IONITOR 20.PGM OFFICE 2  | 54. NIFAFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING  |
| IGER, R.G. NASA HDOTRS OSSA/SRB 202-962-   |   |
| 23 LOCATION 24, DATE 25.LE   |   |
| HAZELTINE CORP. LITTLE NECK, NEW YORK NA 21 MONTHS   | SEE ITEM 31 DELAYED AND REALTIME CONTINUOUS                                       |
| IMAGER. VISIBLE INAGE-ORTHICON CAMERA  | REQUIRES 31 ANALOG AND DIGITAL CHANNELS PER WRITE CYCLE POR                       |
| 29, SPACECRAFT   | HOUSEKEEPING DATA AND 2 CHANNELS FOR SCIENTIFIC DATA: 144-240KHZ                  |
| MET, ERSP APPLICATIONS   | FOR VIDEO DATA AND 50 KHZ FOR VIDEO DATA.   |
| CON CHOICE CON   | S. ADVANT ACES AND LIMIT ALIONS   |
| PALMARY-TO PROFILE DATA TO DEMONSTRATE THE VALUE OF CLOUD COVER THACTED THE RAPHH. ###   |   |
| THE EPPECT OF THE NIGHT GLOW BACKS   | 64. REFERENCES  |
| WER TRAGING HNDER CONDITION  | 1) EXPERIMENT IMPLEMENTATION PLAN FOR MANNED SPACE PLIGHT EX-                     |
|  | PERIMENTS, FORM 1347, -DAY-NIGHT CAMERA SYSTEM (S039). OCTOBER                    |
| 3) PRINCIPLE OF OPENATION  | 30, 1967.   |
| NO THE CONTRACT OF THE CAMPA CYCUTAL AT A CONTRACT OF THE CONT |   |
|  |   |
| P/1.8, 9.5 MM POCAL LENGTH TEGEA THAT GIVES A FOV OF 114.5 DEG.  | 65, HISTORICAL REMARKS  |
| ROM THE SCENE TO BE IMAGED PASSES  | DUE TO DELAY IN AAP APPROVAL, INSTR DEVELOPMENT HAS NOT FUNDED.                   |
| . ONE BEAM IS  | re, DIAGRAMS  |
| A PHOTOMULTIPLIER TUBE, THE OTHER ON THE 0.84 X 0.84 INCH PHOTO-   |   |
| CATHODE OF THE IMAGE-ORTHICON TUBE, THE PHOTOGULTIPLIER OUTFUL   |   |
| CONTROLS IND POSITION OF THE FILTERS WALCH MAYE AN ALTENOSITON DANGE ON 1 DOD DOD BY BY THEODYTH CONTROLS GIVE ANOTHER BETHER OF   |   |
| PRAMES SET THE   |   |
| THE CAMERA AND GIVE A PINAL PICTURE WITH A   |   |
| OP 10 LEVELS OF GRAY, EACH PRAME CONTAINS 840 LINES; 800 LINES   |   |
| CONCRETE TITERS MAY BE DISCED IN THE OPTICAL DATH HON COMMAND.   |   |
| USABLE PICTURES SHOULD BE OBTAINED UNDER ANY ORBITAL LIGHTING  |   |
| CONDITIONS PROM NOON SUN TO STARLIGHT.   |   |
|  |   |
|  |   |
| A ALTERNATIVE ACCEPTANCE   |   |
| VISIBLE LIGHT REPLECTED PROM THE EARTH AND ITS CLOUD COVER   |   |
|  |   |
| PROM 0.0001 TO 10000 PT-LAMBERT  |   |
| S. PHECISION AND ACCORDED SON MOUNT TOHT S. S. N. OF 20 DR POR STARTICHT   |   |
| 1  |   |

|  | INSTRUMENT RESUME  | AANGE  |
|--|--|--|
| NATIO  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>FI ECTRONICS RESEABCH CENTER      | 38 FIFT DOEVIEW TO GROUND SWATH  |
|  | CAMBRIDGE, MASSACHUSETTS   | 8.0 BY 50.0 DEG 20 NM BY 130 NM PROM 140 NM ALTITUDE   |
| 1. TITLE   | 2. ACRONYM 3. EXP NO   | 40 ANGULAR RESOLUTION 41, SPATIAL RESOLUTION   |
| DIELECTRIC-TAPE CAMERA   | DTC ST   | 0.02 DEG 300 FT FROM 140 NM ALTITUDE   |
| (III FE CONT.)   | 4, haboure B. vension  | 42. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION   |
| 6. PRINCIPAL INVESTIGATOR  | 7. ORGANIZATION 8. TELEPHONE   | 13 10.0 DEG U. 15 DEG/SEC LUM CINCULAR REDIUM PUSIGNADE 46, SPECIAL REQUIREMENTS   |
| BRODERICK, J.  | GODDARD SPACE FLT CENTER 301-982-4103  | THE DAY-NIGHT CAMERA SYSTEM (S039) IS USED FOR COMPARISON  |
|  |  |  |
| 12. CONTRACT 13. CONTRACT NUMBER   | BER 14 FLASH INDEX NUMBER 15, START 16, COMPULATION 17, STATUS                     | 148. WEIGHT 149. VOLUME 15 ELECTION LCS 15 STANDBY POWER 152. PEAK POWER 153. MIRE   |
|  | NA NA  | SWATTS   |
| 18. MONITOR  | 20, PGM OFFICE   | UCLEAR 57. INTERFERENCE 58. SHIELDIN   |
| TERWILLIGER, R.G.  | OSSA/SRB 202-962-  | NONE SPASITIVE   |
| 22. VENDOR   | 23. LOCATION 25. THE 24. DATE 25.LE  | 59. CALIBRATION 60. DATA RECOVERY  |
| 26 INSTRUMENT TYPE   | S FRINCETON, NEW JERSEY NA 18 HONTHS   | 62 TELEMETTON BEOLLIBEMENTS  |
| IMAGER, VISIBLE SCANING DIRLECTRIC-T   | APE CAMERA   | POR.   |
| 28, APPLICATION  | 29. SPACECRAFT   | VIDEO CHANNEL (680 KC) POR SCIENTIFIC DATA POR 6 MINUTES I   |
| MET, GEOL, AGRI, CART  | T APOLLO APPLICATIONS  | ICH READOUT CYCLE.   |
| 30. PURPOSE  |  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY-TO DEMONSTRATE THE VALUE OF H  | I  | HIGH RADIATION RESISTANCE OF THE DIELECTRIC TAPE.  |
| TELEVISION FOR METEUROLOGI, GEOLOGI,   | AGRICOLTOKE, AND CART  |  |
| TOTAL SECONDANIATO GALN BARBALENCE NE PRINTERS NO 2 DESTANDA A 2 DESTANDAN A 2 DESTAND | CALN MARKALINCE MALCH WILL BUNKUN ING UNK!   | A MAN TO THE THE TANK |
| EXPLORATORY DEVICE FOR PHILIPS LINES OF  | CAREER AS A GENERAL PURPOSE ALGREKESOLUTION<br>OR PHINE TRIAR OR DIANFIRM MICATORS | CARACA CAPERIDENTALION FLAN FOR BANNED SPACE FILGRY EXPERIBENTS-   |
|  | •  | A AND B PHASE B INTEGRATION STUDY DOCUMENT, NASA/MSC.APRIL 1967.   |
| 31. PRINCIPLES OF OPERATION  |  | DIELECTRIC TAPE CAMERA, RCA ASTRO-ELECTRONICS DIV.   |
| IN THIS INSTRUMENT A SCANNING MIRROR   | SCANNING MIRROR AND A NARROW ANGLE LENS  |  |
| POCUS A SCENE IMAGE THROUGH A NARROW   |  |  |
| TAPE. THE SLIT IS ORIENTED   | LONG   | 65. HISTORICAL REMARKS   |
| OF THE TAPE. LIGHT   | LIGHT REACHES THE TAPE ONLY THROUGH THIS SLIT SO                                   | DUE TO DELAY IN AAP APPROVAL, INSTR DEVELOPMENT WAS NOT FUNDED   |
| THAT AN IMAGE IS STO   | 5  | G. DIAGRAMU  |
| SYNCHRONISM WITH THE SCANNING MIRROR.  | SCANNING MIRROR. THE MIRROR SCANS THE  |  |
| EARTH NORMAL TO THE GROUND TRACK, AND  | A PRAME CONSISTS OF ONE  |  |
| SUCH SCAN. THIS COVERS AN ANGULAR AR   | EA OF 8 DEG  |  |
| TO 2/0 FRANKS PER ORBIT MAY BE STORED  | BIT RAY BE STOKED ON THE 100 FT OF TAPE IN   |  |
| THE CAREAR. INTO TAPE IS A CHOMPINE  | OF CALCALAL  |  |
| CONTRACTOR FROM THE DESCRIPTION OF THE DESCRIPTIONS  | CLING BAIEN. HOES A SECTION OF   | F  |
| THIS SPOT LEAK OFF. AN IMAGE THEN IS   | STORED AS VARIATIONS IN  |  |
| CHARGE ON THE INSULATOR.   | TORAGE T   |  |
| PARED TO AN ORBIT PERIOD.  | THE TAPE IS  |  |
| ELECTRON BEAN WHICH IS MODULATED BY T  | IS NODULATED BY THE STORED CHARGE ON THE   |  |
| TAPE, A FLOOD GUN IS USED TO ERASE OL  | D INFORMATION SO   |  |
| TAPE MAY BE USED AGAIN AND AGAIN. THE  | TAP  | 100  |
| IMAGES WITH 17 LINE-PAIRS  | PAIRS PER MILLIMETER RESOLUTION.   |  |
| 32. PHENOMENA OBSERVED   |  |  |
| SOLAR RADIATION REPLECTED  | ECTED PROB THE EARTH AND CLOUDS  |  |
| 33. MEASUREMENT BANGE  |  |  |
| 32:1 CONTRAST CAPABILITY REPRODUCED  | LITY REPRODUCED OVER 10 GRAY SCALE STEPS   |  |
| 34. PRECISION AND ACCURACY   |  |  |
| STOWAL TO NOISE RATIO IS 38 DB   | 0 1S 38 DB   |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMPRILOSE RESEARCH CENTER       | SANCE 12.5 MICRONS, NA  THE CONSTRUCTOR SESSION THE CO |
|--|--|
| 1 TITLE (2 ACRONYM) 3 EXPINC   | 40 80.0 BY 0.06 DEG.235 NM BY 840 PRET PROM 140 NM ALTITUDE  |
| CHANNEL SCANNING IMAGER DCSI S   | 1. 1.  |
| 3 ا ر  | A DEG/SEC LOW CIRCHIAN ME  |
| 8. TELEP   | L REGUINGMENTS   |
| HOLTER, M.R. UNIVERSITY OF MICHIGAN 313-483-0500   | CRYOGENIC COOLING TO APPROX 28 DEG K REQUIRED FOR IR CHANNEL   |
|  | CANNER, COOLANT, RECORDER.   |
| TYPE 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE   | FENACE POWER, SILSTANDBY R   |
| 18. MONITOR   NA   NA   INACCT PROPOSAL   18. MONITOR   19. AGENCY   20. PGM OFFICE 21. TELEPHONE                            | 100 LB 3.0 CU FT 50 WATES 25 WATES 75 WATES  |
| IGER, R. G. NASA HDOTRS  | SENSITIVE SENSITIVE  |
| NA   | ITEM 31 BANNED RETURN  |
| THANDO DATE TO VATCIDIO CONNING DOD  | ON TELEASTRY SECUREMENTS NOT NOTICE TO COMMUNICATION OF SECURETE   |
| 29. SPACECHAFT   | TOTOL  |
| ZRSP, RET<br>30 PURPOSE  | 53 A046 23.75 AXD 10174 TOMS   |
| -TO RECORD IN GRAPHIC PORM THE TERRAIN RADIANCE AS   |  |
| SERVED SINGLIAMENDOSET IN TWO SPECTRAL BANDS (EMISSION AND RE-   | 04. RECETANCES   |
| MULTIBAND SCANNER IN ORBITAL BARTH RESOURCES SURVEY OPERATIONS   | 1) EXPERIMENT IMPLEMENTATION PLAN FOR MANNED SPACE PLIGHT  |
| AND TO GENERALE THE INPORMATION MEEDED FOR AN OPERATIONAL SYS-   | EXPERIMENTS; DUAL-CHANNEL SCANNER-IMAGER (S102). NASA, OCT 30,67.  |
| 31. PRINCIPLES OF OPERATION  |  |
| D2   |  |
| AND  | GE HISTORICAL REMARKS  |
| MICRONS, THE SCANNER WILL HAVE AN INSTANTANEOUS FIELD OF VIEW  | DUE TO DELAY IN AAP APPROVAL, INSTR DEVELOPMENT WAS NOT FUNDED.  |
| OF ONE ALLLIANDIAN AND A TOTAL SCAN ANGLE OF SO DEG WALCH WILL GIVE A GROUND RESOLUTION OF APPROX 840 PT PROK A 140 NM ALTI- | TO COLOR OF THE PROPERTY OF TH |
| SECOND   |  |
| UOUS SCAN LINES IN THE STRIP MAP. THE SCANNER CONSISTS OF A  |  |
| SCANS THE TERRAIN BENEATH THE VEHICLE AND ACROSS THE   |  |
| GROUND TRACK. THE RADIATION IS REPLECTED THROUGH THE TELESCOPE AND OWN A DEAM CONTINUED DANS                                 |  |
| R AND IS FOCUSED ONTO A  |  |
| COOLED THERMAL DETECTOR, MAVELENGTHS LESS THAN 1 MICRON ARE  |  |
|  |  |
| DIRECT FILM  |  |
| THE SCANNER ASSEMBLY INCLUDES REPERENCE DEVICES AND OPTICS TO PROVIDE CALIBRATION PULSES DURING THE INACTIVE PORTION OF EACH |  |
| SCAN.  |  |
| TERRAIN BADIANCE IN THO SPECTRAL BANDS, VISIBLE AND IR,  |  |
| 16 LEVELS OF GRAY PROVIDE A RANGE OF +-8 KELVIN DEG AT 320 DEG K   | _  |
| DEG AT 320 DEG   |  |
| THE OTHER WATER  |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  | SPECTRAL HANGE   |
|--|--|
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS  | 100. DEG 330 NN DIAN CIRCLE FROM 125 NN ALTITUDE   |
| 00 60  | Wildh  |
| TITLE CONT.) A REGUE 6. WASON  | 142. POLICY DEG NO EXUA 140 NO ALTITUDE 45, INCL. ATTION   |
|  | LOW CIRCULAR   |
| 7. ORGANIZATION  | ı  |
| 9. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE  | ANTENNA MUST HAVE UNCHSTRUCTED VIEW OF THE EARTH   |
|  | NTENNA, BLECTRONICS  |
| TYPE 13 CONTRACT NUMBER 14, FLASH INDEX NUMBER 15 DATE   | 50. AVERAGE POWER   51, STANDRY POWLH  |
| 18 MONITOR IN AGENCY   20 PRIN OFFICE 21 TELEPHONE   | 30 LB 1.5 CO PT 20 WATTS 18 WATTS 28 WATTS   |
| IGER, R.G. NASA HOQTRS OSSA/SRB 202-962-   | ENSITIVE   |
| 23 LOCATION 24 FLIGHT 25 LE  | 66. DATA RECOVERY  |
| SPACE GENERAL CORP. BL MONTE, CALIFORNIA NA 18 MONTHS.   | SEE ITEM 31 AS PROGRAMMED SETERAL AS PROGRAMMED  |
| ELECTRICALLY-SCANNING MICROWAYE  | 10 BIT WORD READ EACH 40 MILLSEC, SERIAL READOUT POR SIGNAL, AND   |
| ICATION  | THREE HOUSEKEEPING SIGNALS   |
| GRI, AIR-PHIS 30 PURPOSE   | 10 A. A. A. A. A. A. A. A. A. A. A. A. A.  |
| THE TA HERE OF THE TO SELECTED AND THE OF THE OF-PARTING   | CHINALOW AVOIDS AND TO NOW THE THEODOGOGOUS AND THE TAX TO THE TAX AND THE TAX TO THE TA |
| N ORDER THAT CORRELA   | THE GROUND OR ON THE S/C.  |
| CAN BE NADE BETWEEN THESE MICROWAVE TEMPERATURES AND METEORO-  |  |
| LOGICAL OR GEOPHYSICAL PHENOMENA.  | 1) NASA EXPERIMENT IMPLEMENTATION PLAN FOR MANNED SPACE FLIGHT<br>EXPERIMENTS-ELEC-SCAN MICROGAVE NADIOMETER (SOUS), OCT 30, 1967  |
|  |  |
|  |  |
| INTERPOLENCE AND TOUCHER IN A SHALL MADIO TELESCOPE DESIGNED TO HAKE MEASUREMENTS (ARSOLUTE ACCHRACY TO 1,10 DEG X WITH A    |  |
| 0F   | SA MISTORICA, REVARXS  |
| FREQUENCY OF 19.35 GHZ)  | DUE TO DELAY IN APP APPROVAL. INSTR DEVELOPMENT WAS NOT FUNDED   |
| MITH A 200 MHZ BANDRIDTH, THE RADIOMETER CONSISTS OF A MICROWAVE RECETURE AND A 2 DIRECTORAL DRACED ARRAY ANTENNA CONTAINING | Feb DIACRAMS   |
| 49 LINEAR ARRAYS. THE ANTENNA IS DESIGNED TO SCAN ELECTRONI-   |  |
|  |  |
| THE MADIK, IN A LINE PERPENDICULAR TO THE GROUND TRACK OF THE SAC. THE ANGILLAR RESOLUTION OF THE ANTRINA IS 2.7 DEC (3 DE   |  |
| POINTS) AT NADIR AND 3 DEG AT THE MAXIMUM SCAN POSITION. THE   |  |
| NOISE TEMPERATURE OF THE ANTENNA IS 1040 DEG K, AND THE SIDE   |  |
| LODGS CONTAINING A DARKING OF O PERCENT TO THE SIGNAL. THE INTEGRATION TIME FOR BACH SCAN STRP IS LO MSRC. AND THE REGILT-   |  |
| WORD. THE RADIOMETER IS  |  |
| REPERENCE AND AN IN  | -  |
| SOURCE FOR A HOT REFERENCE TERPERATURE.  |  |
|  |  |
|  |  |
| INTERSITY AT 1.55 CM (MICROWAVE) OF THERMAL RADIATION PROM BARTH   |  |
| DYNAMIC RANGE = 50 TO 330 DRG K  |  |
| 18 COLUMN AND ACCURACY   |  |
| 1  | A THE PARTY OF THE |

| INSTRUMENT RESUME  | NANGE 39. TIME CO.   |
|--|--|
| NATIONAL AETONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESERVEN CENTER CAMBRIDGE, NASSACHUSETTS                             | 23 FIGELOGY VIEW 3.0 DEG 3.5 NA BY 10.5 NM PROM 200 NM ALTITUDE  |
| 2. ACRONYM   | GULAR HESCLUTION 1. SPATIAL RESOLUTION   |
| EDGE SPECTROMETER  |  |
| 111 LE CON 1.)   | 2.0 DEG 0.5 DEG/SECTION CTRUSTAN MEDITAM POSTGRADE   |
| 8. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | ECIAL REQUIREMENTS   |
| GODDARD SPACE PLT CENTER   | REQUIRED SUPPORT EXPTS ARE: IRIS, ITPR, AND IR COLOR PHOTOGRAPHY   |
| 9. CO-INVESTIGATOR IS UNISANIZATION  | OPTICAL SYSTEM CONTING SYSTEM  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATE 16. CONTRACT STATUS  | 48. VEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDBY POWER 52. PEAK POWER 53. MTBF  |
| NA NA  | 30 LB 1.3 CH FT 7 WATES 5 WATES  |
| TERMITILIGER R.G. NASA HOOTES OSSA/SEB 202-962-0574  | 34 INTERPRESIDE 35 INTERFERENCE 35 INTERFERENCE 36 INTERFERENCE 36 SHELDING  |
| 23 LOCATION  |  |
| 26 INSTRIMENT TYPE   | REASUREMENT OF BLACK BDY DELAYED TELEMETRY AS PROGRAMMED OF THE FINANCE OF THE FI |
| CIRCULA R-WEDGE-INTERPERENCE-  | 130 SPECTRAL ELEMENTS, AND CHANNEL 2 CO  |
| 29. SPACECRAFT MPT VRSD APPLICATION  | 54. BACH ELEMENT CONTAINS 10 BITS. 15 SEC ARE REQUIRED TO SCAN PACH WHEET TOTAL DATA RATE IS 105 ADS. A DATA RIN LASTS 30 MIN.   |
|  | DLIMITATIONS   |
| PRIMARY - TO INVESTIGATE WITH HIGH RESOLUTION THE IR SPECTRA   |  |
| RECEIVED BY AN INSTRUCTENT ABOVE THE ATHOSPHERE AND TO STODY THE PRECES OF ABSORPTION IN THE ATHOSPHERE AND SCATTERING BY DUST | 64. REFERENCES   |
| -  | 1) APPLICATIONS A AND B PHASE B INTEGRATION STUDY DOCUMENT, NASA/  |
| METER TO DETERMINE GROUND CONDITIONS.  | MSC, APRIL 1967.   |
| 3). PAINCIPLES OF OFERATION  |  |
| SCOPE WITH AN F/   |  |
| CHRONOUS MOTORS FOR THE CHOPPER AND PILITER WEDGE, A LEAD SELEN-   | 65, HISTORICAL REMARKS   |
| IDE DETECTOR WITH A LIQUID-NITROGEN COOLING SYSTEM, AND THE PIL-   | SIMILAR INSTRUMENT SCHEDULED TO FLY ON NIMBUS D.   |
| TER-WEDGE ITSELF. THIS IS A 10-CM (4 INCH) DIAMETER ROTATING   | ing. DIACHAMS  |
| INTERPERENCE FILTER THAT, WITH A BLOCKING PILTER, TRANSMITS ONLY   |  |
| TATION ANGLE. HALF THE WEDGE COVERS A SPECTRAL RANGE OF 1.5 TO 6   |  |
| 2  |  |
| 0 0.01.  |  |
| POSITION OF THE WEDGE IS MONITORED AT 2 POINTS DURING EACH ROIA-   |  |
|  |  |
| 9.7  |  |
| NOTES DART FROM A NEGRO BLACKBODI. AT 4 MICKONS THE SIGNAL TO  |  |
| FERNGTHS. THE S/N FOR  |  |
| E OF THE ATMOSPHERE  |  |
| THE SURFACE IN THE POV. VERTICAL TEMPERATURE PROFILES AND WATER UNDER CONTRY CAN BE INPERRED DAING INVERSION TECHNIQUES.       |  |
| 32. PHENOMENA OBSERVED   |  |
| IR RADIATION REPLECTED AND EMITTED PROM THE EARTH'S ATMOSPHERE   |  |
| 33. MEASUREMENT RANGE  |  |
| 34. PRECISION AND ACCURACY   |  |
| SIGNAL BEASURED TO ONE PART IN 500   |  |
|  |  |

| THE STANDOWN A EXPNO  LACACHER STAND  R. TELEPHONE  CENTER STAND  R. TELEPHONE  IN TELEPHONE  SSA/SRB 202-9528  R. TELEPHONE  SSA/SRB 202-952-0574  SSA/SRB 202-0574  SSA/SRB 20 | INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | 36. SPECTRAL RESOLUTION 37, TIME CONSTANT 5.0 TO 22.0 MICRONS 0.85 PERCENT 39. FIELD OF VIEW 39. FIELD OF VIEW 39. FIELD OF VIEW |
|--|--|--|
| TERES SOUTO  R. TELEPHONE  11/10/69 0003  CENTER 301-982-4528  11/10/69 0003  T. TELEPHONE  IN TELEPHONE  SSA/SRB 202-962-0574  FORM OFFICE 2. TELEPHONE  R. VAPOR DISTRIBUTION, AND  SURE CHA, N20, AND OTHER  ANALYZE THE EPPECTS OF  R. VAPOR DISTRIBUTION, AND  SURE CHA, N20, AND OTHER  ANALYZE THE EPPECTS OF  STICS OF GEOLOGICAL AND  STICS OF GEOLOGICAL AND  NAINDON.  THE INSTRUCTION  SCHOOLING AT THE MEDIAN OF  COMPONENTS WHICH RECOMBINE  ERMANIUM DETECTOR, SIZED  ELD OV PEW. SIZED  SOLUTION AT THE MEDIAN OF  COMPONENTS WHICH RECOMBINE  SOLUTION AT THE MEDIAN OF  COMPONENTS WHICH RECOMBINE  SOLUTION AT THE MEDIAN OF  COMPONENTS WHICH RECOMBINE  COMPONENTS WHICH RECOMBINE  RAND THE MODULATION IS  RAND THE MODULATION IS  RAND THE MODULATION IS  RAND THE BETECTOR,  CALIBRATION INTERFERO  DI AT 300 DEG K AND ONE  R THAN I PERCENT.   | CAMBRIDGE, MASSACHUSETTS   | 2.0 DEG 5 NW DIAM CIRCLE PROM 140 NW ALTITUDE  |
| CENTER 301-982-4528  CENTER 301-982-4528  11710/69 0003  11710/69 003 | SHELL  | 2.0 DEG 5 NY PROM 140 NM ALTITUDE  |
| CENTER 301-982-4528  OLUTION AND THE EPHONE  ON WINDOWS  STACK OFFICE AT TELEPHONE  TO SPACECRAFT  TO SPACE SPACECRAFT  TO SPA | 4. RESUME<br>DATE  | 44. ALTITUDE 45. INCLINATION   |
| THE STATE TO THE STATUS  IN THE STATE  IN TH | 7. ORGANIZATION B. TELEP   | 05 DEG/SEC LOW CIRCULAR  |
| ER PESTANT RECOMMENDED.  NATIONAL STATUS  SSA /SRB 202-962-0574  SSA /SRB 202-962-0574  SSA /SRB 202-962-0574  NA 21 NONTHS  NA 21 NONTHS  NA 22 NONTHS  NA  | .A. GODDARD SPACE FLT CENTER   | 12 COMPONENTS  |
| ER PE SATE NEW STATUS  NA INACT PUT HODEL  SSA/SRB 202-652-0574  SSA/SRB 202-652-0574  SSA/SRB 202-652-0574  NA 21 ROBITS  NA 300 RECEVER  RAND THE MODULATION IS  RAND THE  |  | PECTROMETER, ELECTRONICS   |
| POGNOFICE 21 TELEPRONE  SSA, SEBB 202-96,-0574  NA 21 NONTHS  NA 21 NONTHS  NA 10110 APPLICATION, AND  SURE CH4, N20, AND OTHER  ANALYZE THE PEPECTS OF  RUADOR.  STICS OF GEOLOGICAL AND  STICS OF GEOLOGICAL AND  NAINDON.  THE INSTRUCT  SCHOOL OF THE BERNATH  STICS OF GEOLOGICAL AND  ON WINDON.  STERN SPECTRONETER, IT IS  AND DINSTRUMENT EXCEPT  ERRANIUM DETECTOR, SIZED  ON WINDON.  STEEN SPECTRONETER, IT IS  AND DINSTRUMENT EXCEPT  ERRANIUM DETECTOR, SIZED  COMPONENTS WHICH REDIAN OF  COMPONENTS WHICH RECOMBINE  SCHED OF THE NEDIAN OF  COMPONENTS WHICH RECOMBINE  CURED ON THE DETECTOR,  SER TRANSFORM OF THE SPEC-  A PREDETERMINED NUMBER OF  CALIBRATION INTERFERO-  DI AT 300 DEG K AND ONE  THAN I PERCENT.  | 13. CONTRACT NUMBER 14. TLASH MOEX NUMBER 16. STATE NA NA NA   | 50. AVERAGE POWER 51. STANDBY POWER 52.  |
| SSA/SRB 202-965-0574    NA   21 KONTHS   100   1 | 19, AGENCY POPPON OFFICE 2   | 50. INTERFERENCE   |
| THE STATE OF THE S | LIGER, R.G.   BASA HDQTRS   OSSA/SRB 202-962-(   | SENSI  |
| APOLLO APPLICATIONS  R VAPOR DISTRIBUTION, AND SURE CH4, N20, AND OTHER ANALYZE THE EPPECTS OF RMINATION OF THE ABOVE.***  STICS OF GEOLOGICAL AND ON WINDOR.  THEND OF THE REPECTS ON WINDOR.  THEND OF THE REPECTS ON STRUCTOR.  THEND OF THE REDIAN OF ONS. RECEIVED RADIATION COMPONENTS WHICH RECOMBINE FIXED AND MOVING HIRRORS SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION COMPONENTS WHICH RECOMBINE FIXED AND MOVING HIRRORS CUED ON THE DETECTOR, ONS. THE MODULATION IS RROR. THE MODULATION IS RROR.  THE MODULATION INTERFERO- DI AT 300 DEG K AND ONE FAHAN I PERCENT.   | MENTS DALLAS, TEXAS NA   | 31 DELAYED TELEMETRY   |
| APOLLO APPLICATIONS  R VAPOR DISTRIBUTION, AND SURE CH4, N20, AND OTHER ANALYZE THE EPPECTS OF STICS OF GEOLOGICAL AND ON WINDOW.  IMENT IS A TWEAN-GREEN ERRANITH DETECTOR, SIZED IELD OF VIEW. THE INSTRU- SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION COMPONENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS CURED OF THE MEDIAN OF ONS. RECEIVED RADIATION SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION SOLUTION AT THE DETECTOR, IS RROR. THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS CALIBRATION INTERFERO- DI AT 300 DEG K AND ONE R THAN I PERCENT.  | MICHELSON INTERPEROMETER   | 3.75 KBS IN 10-BIT WORDS, 1 CHANNEL  |
| R VAPOR DISTRIBUTION, AND SURE CH4, N20, AND OTHER RAINATION OF THE BPEECTS OF STICS OF GEOLOGICAL AND ON WINDOW.  IMENT IS A TWWHAN-GREEN ETER/SPECTROMETER, IT IS AND DINSTRUMENT EXCEPT ELD OF VIEW, THE INSTRU- SOLUTION AT THE MEDIAN OF COMPONENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS CORPORENTS WHICH RECOMBINE FIXED ON THE DETECTOR, IS RNOR, THE MODULATION IS RNOR, THE MODULATION IS RNOR, THE MODULATION IS RNOR, THE MODULATION IS RNOR, THE MODULATION IS CALIBRATION INTERFERO- DI AT 300 DEG K AND ONE FRAN THAN I PERCENT.   | A POLT O A POT TO A MITON C  |  |
| R VAPOR DISTRIBUTION, AND SURE CR4, N20, AND OTHER ANALYZE THE EPPECTS OF RMINATION OF THE ABOVE.*** STICS OF GEOLOGICAL AND ON WINDOW.  INENT IS A TWWAAN-GREEN ETER/SPECTROMETER, IT IS AND INSTRUMENT EXCEPT ERRANIUM DETECTOR, SIZED ELLO OF VIEW, THE INSTRU- SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION COMPONENTS WHICH RECOMBINE FIED OF VIEW, THE NEDIAN OF ONS. RECEIVED RADIATION ONS. RECEIVED RADIATION ONS. THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS CALIBRATION INTERFERO- DI AT 300 DEG K AND ONE E AND ATMOSPHERE  | יאנס מחסדה בחשת שווו   | 52 ADVANTAGES AND LIMITATIONS  |
| ANALYZE THE EPPECTS OF AND DIHEK RAILMATION OF THE BOPECTS OF STICS OF GEOLOGICAL AND ON WINDOW.  IMENT IS A THYMAN-GREEN ERRAND D INSTRUMENT EXCEPT ERRAND D INSTRUMENT EXCEPT SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION COMPONENTS WHICH RECOMBINE FIXED AND MONING MIRRORS CUSED ON THE DETECTOR, IS RAND THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS RAND THE MODULATION IS ER TRANSFORM OF THE SPECTOR A PREDETERMINED NUMBER OF CALIBRATION INTERFEROD OF AT 300 DEG K AND ONE  | R VAPOR DISTRIBUTION   |  |
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| STICS OF GEOLOGICAL AND  ON WINDOW.  IMENT IS A THYMAN-GREEN  ETER/SPECTROMETER. IT IS  AND D INSTRUMENT EXCEPT  ELD OF VIEW. THE INSTRU- SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION COMPONENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS CUSED ON THE DETECTOR, IS RAND THE MODILATION IS R AND THE WAY BUNBER OF CALIBRATION INTERFERO- DI AT 300 DEG K AND ONE  E AND ATMOSPHERE  | RMINATION OF   | 1) NASA EXPERIMENT IMPLEMENTATION PLAN FOR MANNED SPACE PLIGHT   |
| THENT IS A THYMAN-GREEN  ETER/SPECTROMETER. IT IS AND D INSTRUMENTS, NASA/ERC  ETER/SPECTROMETER. IT IS AND D INSTRUMENT EXCEPT BERANIUM DETECTOR, SIZED OUT INSTRUMENT TO NOTE TO DELAY IN AAP AP FIRED OF VIEW. THE INSTRU- COMPONENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS CUSED ON THE DETECTOR, IS RROR. THE MODULATION IS RAND FHE DETECTOR, ER TRANSFORM OF THE SPEC- A PREDETERMINED NUMBER OF CALIBRATION INTERPERO- DI AT 300 DEG K AND ONE E AND ATMOSPHERE  FIXED THAN I PERCENT.  | SECONDARY - TO STUDY THE IR CHARACTERISTICS OF GEOLOGICAL AND ACELCHARMENT CHERACES IN MUR 0-13 MICRON STRONG                      | PERIMENTS FOR IR INT   |
| ETER/SPECTROMETER.  ETER/SPECTROMETER.  AND DINSTRUMENT EXCEPT ERMANUTH DETECTOR, SIZED  IELD OF VIEW. THE INSTRU- SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION  CORPONENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS  CUSED ON THE DETECTOR, IS  RAOD THE DETECTOR, IS  RAOD THE DETECTOR, IS  RAOD THE DETECTOR,  ER TRANSFORM OF THE SPEC- A PREDETERMINED NUMBER OF CALIBRATION INTERFERO- DI AT 300 DEG K AND ONE  E AND ATMOSPHERE   | 31. PRINCIPLES OF OPERATION  | 2) NINCHES NASA/ERC PM-6713, JUNE 1967.  |
| ETER/SPECTRONETER. IT IS EAND D INSTRUMENT EXCEPT ERANIUM DETECTOR, SIZED IELD OF VIEW. THE INSTRU- SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION COMPONENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS CUSED ON THE DETECTOR, IS RROR. THE MODULATION IS R AND THE WAVE NUMBER OF GNAL PROM THE DETECTOR, ER TRANSFORM OF THE SPEC- A PREDETERMINED NUMBER OF CALIBRATION INTERFERO- DI AT 300 DEG K AND ONE E AND ATMOSPHERE   | THE PROPOSED INSTRUMENT FOR THIS EXPERIMENT IS A THYMAN-GREEN  |  |
| ERMANIUM DETECTOR, SIZED IELD OF VIEW. THE INSTRU- SOLUTION AT THE MEDIAN OF ONS. RECEIVED RADIATION CORPORENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS CUSED ON THE DETECTOR, IS RROR. THE MODULATION IS R AND THE WAYE NUMBER OF GNAL FROM THE DETECTOR, ER TRANSFORM OF THE SPEC- A PREDETERMINED NUMBER OF CALIBRATION INTERFERO- DY AT 300 DEG K AND ONE E AND ATMOSPHERE  | NODIFICATION OF A RICHELSON INTERFEROMETER/SPECTROMETER. IT IS<br>ESSENTIALLY IDENTICAL TO THE NIMBUS 3 AND D INSTRUMENT EXCEPT    | 85, HISTOMICAL REMARKS   |
| LELD OF VIEW. THE INSTRUCTOR OF THE MEDIAN OF SOLUTION AT THE MEDIAN OF CORPONENTS WHICH RECOMBINE FIXED AND MOVING MIRRORS CUSED ON THE DETECTOR, IS RAND THE MOVILATION IS RAND THE MOVE NUMBER OF GALIBRATION INTERFEROLD AT 300 DEG K AND ONE BY THAN I PERCENT.   | FOR A SOLID-NEON COOLED COPPER-DOPED GERMANIUM DETECTOR, SIZED   | DUE TO DELAY IN AAP APPROVAL, INSTR DEVELOPMENT WAS NOT FUNDED.  |
| COMPONENTS WHICH RECOMBONENTS WHICH RECOMBORENTS WHICH RECOMBERS ON THE DETECTOR, IRROR. THE MAVE NUMBER OF THE WAVE NUMBER OF THE SPECTOR, A PREDETERMINED NUMBER CALIBRATION INTERFERODY AT 300 DEG K AND ONE E AND ATMOSPHERE   | AND POSITIONED TO PROVIDE A 2 DEGREE FIELD OF VIEW. THE INSTRU-<br>MENT WILL BE CAPABLE OF 0.07-MICRON RESOLUTION AT THE REDIAN OF | Let Divid A visit  |
| COMPONENTS WHICH RECOMBY TYRED AND MOVING MIRROL GUSED ON THE DEFECTOR, RROR. THE MAVE NUMBER OF GNAL FROM THE DETECTOR, A PREDETERMINED NUMBER CALIBRATION INTERFERO- DY AT 300 DEG K AND ONE E AND ATMOSPHERE  | THE SPECTRAL RANGE OF 5.0 TO 22.0 MICRONS. RECEIVED RADIATION  |  |
| CUSED ON THE DETECTION IN RROR. THE MADULATION IS AND THE WAVE NUMBER OF GNAL FROM THE DETECTOR, A PREDETERMINED NUMBER CALIBRATION INTERFERODY AT 300 DEG K AND ONE E AND ATMOSPHERE  | IS DIVIDED BY THE BEAMSPLITTER INTO 2 COMPONENTS WHICH RECOMBINE AND THYRDERED AND ADDRESS AND MISSORE                             |  |
| RROR. THE MODULATION IS R AND THE WAVE NUMBER OI R ALL BROM THE DETECTOR A PREDETERMINED NUMBER CALIBRATION INTERFERO- DY AT 300 DEG K AND ONE E AND ATMOSPHERE  | _  |  |
| GNAL FROM THE DETECTOR,  ER TRANSFORM OF THE SPEC A PREDETERMINED NUMBER CALIBRATION INTERFERO- DY AT 300 DEG K AND ONE E AND ATMOSPHERE   | E  |  |
| ER TRANSFORM OF THE SPECAL INTERPERODIT AT 300 DEG K AND ONE EAND ATROSPHERE   | THE INCIDENT RADIATION. THE OUTPUT SIGNAL PROM THE DETECTOR,   |  |
| CALIBRATION INTERFERO- DY AT 300 DEG K AND ONE E AND ATMOSPHERE  | ER TRANSFORM OF THE SPEC<br>A PREDETERMINED NUMBER   |  |
| E AND ATMOSPHERE   | CALIBRATION INTERFERO-<br>DY AT 300 DEG K AND ONE  |  |
| E AND ATMOSPHERE   | FOR OUTER SPACE AT NEAR O DEG K.   |  |
| E AND ATMOSPHERE   | . :  |  |
| OP INTENSITY BETTER THAN   | E AND ATMOSPHERE   |  |
| RTHAN  |  |  |
| 111111111111111111111111111111111111111  | ABSOLUTE ACCURACIES OF INTENSITY BETTER THAN 1 PERCENT.  |  |

|  | 6.0 DEG 12 NM FROM 120 NM ALTITUDE  1.0 DEG 1.0 DEG/SEC LOW CIRCULAR MEDIUM POSIGRADE TEMPERATURE RANGE -15 TO 50 DEG C; NO DIRECT SUNLIGHT IN POV |  | DATA RATE IS 10 WORDS PER SECOND; A TOTAL OF 25 CHANNELS IS REQUIRED FOR IR DATA, INTERNAL REFERENCE AND HOUSEKREPING. THE IR DATA IS SENT IN ANALOG FORM.  TO A REFERENCES  OF A REFERENCES  1) NASA EXPERIMENT IMPLEMENTATION PLAN FOR MANNED FLIGHT EXPTS  IR TEMPERATURE PROFILE RADIOMETER (\$050), OCTOBER 30, 1967. | DUE TO DELAY IN AAP APPROVAL, INSTR. DEVELOPMENT WAS NOT EUNDED  |   |
|--|--|--|--|--|---|
| UME ADMINISTRATION SETTS SETTS SACRONN | MONETER<br>SAT CIR, ESSA   | 10 OF STIGNT   10 OF STIGNT   11 TELEPHONE   11 TELEPHONE   12 OF STAFF   13 OF STAFF   13 OF STAFF   13 OF STAFF   14 OF STAFF   15 OF STAFF   15 OF STAFF   15 OF STAFF   16 OF STAFF   16 OF STAFF   17 OF STAFF   18 OF STAF | RADIORETER, MULTI-CHANNEL SCANNING PILTER IR  28. APPLICATION  APOLLO APPLICATIONS  30. PURPOSE  PRIMARY-TO DETERMINE A SIMPLIFIED THREE-DIMENSIONAL TEMPERATURE PIELD OF THE BARTH'S ATHOSPHERE FOR METEOROLOGICAL PURPOSES, ***  SECONDARY - TO PROVIDE CONTROLLED TESTING OF THE PERFORMANCE OF  THE INSTRUMENT.        | THIS INSTRUMENT IS A MODIFIED VERSION OF THE MEDIUM RESOLUTION THIS INSTRUMENT IS A MODIFIED VERSION OF THE MEDIUM RESOLUTION SCANNING IR FILTER RAIDOMETER PLOWN SUCCESSFULLY ON NIMBUS. THE INSTRUMENT IS DESIGNED TO MEASURE THE IR ENERGY FROM THE EARTH- 14.4, 14.1, 13.8, 13.3, 11.1, AND 3.8 MICRON WITH SPECTRAL 14.4, 14.1, 13.8, 13.3, 11.1, AND 3.8 MICRON WITH SPECTRAL 14.4, 14.1, 13.8, 13.3, 11.1, AND 3.8 MICRON WITH SPECTRAL 14.4, 14.1, 15.8, 13.3, 11.1, AND 3.8 MICRON WITH SPECTRAL 15.8 MEDIAGORIAN OF A PER MILLISECONDS. A CONSTANT ORIENTATION OF THE INSTRUMENT IS REQUIRED, WITH THE SWATH PASSING SYMMETRIC ALLY THROUGH OR NEAR THE SUB-SATELLITE POINT. A VIEW OF SPACE IS REQUIRED PERIODICALLY FOR A ZERO REPERBNCE. THE RADIOMETER ASSEMBLY CONSTAINS THE INPUT AND PREAMPLIFIERS. AND STATE OF THE SCANNING MIRROR, PRIMARY OPTICAL ELEMBRYS. FILTERS, DETECTORS AND PREAMPLIFIERS, SIGNAL DRIVER POURE SUPPLY, AND REPERBNCE SIGNAL AND OUTPUT FILTERS, ELECTRON- TOR. RADIOSOUDE DATA CONCURRENT WITH SPACECRAFT ACQUIRED DATA ARE NEEDED TO COMPARE ACTUAL TEMPERATURE PROFILES WITH THOSE PROFILED. | 32. PREMINDES.  13. MEASUREMENT RANGE  13. MEASUREMENT RANGE  14. PRECISION AND ACCURACY  15. WILL BE 100 TO 1 OR BETTER FOR ALL CHANNELS |

| PRIMARY—TO DETERMINE THE ATMOSPHERIC TEMPERATURE AND WATER VAPOR VERTICAL PROFILES WITH EMPHASIS ON HIGH VERTICAL RESOLUTION. *** SECONDARY—TO DETERMINE THE SURFACE OR CLOUD TOP TEMPERATURES AND PERCENT CLOUD COVER.  1) NASA EXPERIMENT INPLEMENTATION PLAN FOR MANNED SPACE PLICHT EXPERIMENTS FOR IR TEMPERATURE (SO43). OCTOBER 30, 1967  THE SYSTEM CONSISTS OF A NODIFIED EBERT FIXED GRATING SPECTRO— HETER PLUS A PILTER RADIOMETER. RADIATION FROM A 12 DEGREE FOUNDED BUILT RADIOMETER. A 250—LIN—PER—M GRATING THAT IS THE LIMITING APERTURE OF THE SYSTEM DISPERSES THE LIGHT TO 15 SEPARATE, LEAD-SELRIDE (PBSE) DETECTORS COOLED   |
|---|
| TO 193 DEG K. THEY COVER SPECTRAL INTERVALS IN THE REGION 3.5 TO 6.0 HIGHONS AND ARE DESIGNED TO GIVE A RESOLUTION OF 1 PERCENT. THE OUTPUT IS USED IN A MATHEMATICAL INVESSION OF THE RADIATIVE TRANSPER EQUATION FOR A VEHTICAL TEMPERATURE PROFILE UP TO THE 1 HB LEVEL. A TUNING FORK CHOPPER OPERATING AT ABOUT 300 HZ AT THE ENTRANCE SLIT PROVIDES A TEMPERATURE OF THE CHOPPER'S BY MAINTAIN- ING AND REAGURING THE TEMPERATURE OF THE CHOPPER'S INNER SURFACE TO 0.1 DEG K. THE FILTER RADIOHETER CONTAINS 5 CHANNELS EACH RE- SPONDING TO 4.6 TO 6.0 MICRON RADIATION TO GIVE CLOUD COVER DATA. HOWEVER, EACH CHANNEL COVERS A DIFFERENT 2.4 BY 2.4 DEGREE POBTION OF THE SPECTROMETER'S 2.4 BY 12 DEG FOV. BY SAMPLING THE SPECTROMETER AND ALLOWING FOR S/C MOTION, A 25 ELEMENT RADIANCE HAD OF THE SPECTROMETER VIEW IS OBTAINED. AN INTERNAL BLACKBODY PROVIDES PERIODIC CALIBRATION.  23. PHENOMENA OBSERVED  DYNAMIC RANGE: 10,000: RADIANCE VALUES 200 TO 300 K.  34. PHECISION AND ACCUHARCY 34. PHECISION AND ACCUHARCY 35. PHENOMENA AND EMITTED RADIANCE VALUES  DYNAMIC RANGE: 10,000: RADIANCE VALUES  36. PHECISION AND ACCUHARCY 37. PHENOMENA OFFER  DYNAMIC RANGE: 10,000: RADIANCE VALUE |

| NATIONAL AL SOLL, T. R. (Solar)  ANTIONAL AL SORAND COLOR AL DAL BANDON (ANTION COLOR SOLD SANTON (ANTION COLOR SANTON (ANTION COLOR SANTON COLOR SANTON COLOR SANTON (ANTION COLOR SANTON CO | 0.4 TO 0.7 HICRON INA SPECTRAL RESCLUTION A TIME COMITMANT OF STREET OF STRE |
|--|--|
| a ACHONYIN C. E.A. NO.   | 12.0 DESCRIPTION OF STORY FACTOR 140 AND   |
| METRIC CANERA (TITLE CONT. A RESOUR.   | 0.01 DEG 40-50 LINES/MM = 150-200 FEET FROM 140 NM ALTITUDE  |
| 11/10/69 0   | 0.05 DEG/SEC LOW CIRCULAR ME   |
| R 7. ORSANIZALION  |  |
| SCHMID, DR. H.H. IESSA-INST POR BARTH SCI 301-496-8531   | EXPOSURE TIME, S/C TIME, AND UNIVERSAL TIME MUST BE RECORDED   |
|  | METRIC CAMERA, STELLAR CAMERA, RECORDING AND CONTROL EQUIPMENT   |
| TACE TO CONTRACT NUCLEAR OF THE SECOND STATES OF THE SECOND SECON | A ALC VOLUE SO AVERAGE POWER SLISTANDET FOWER S2 PEAK POWER IS3 MTRE   |
| INA NA INACT PROPOSAL IN MA IN MA IN THE PHONE   | 200 LB 12.5 CU PT 250 WATTS NONE 400 WATTS   |
| IGER, R.G. NASA HDQTRS OSSA/SAB 202-962-0  | SENSITIVE  |
| 22 VENDOR 24 VENDOR 24 VALUE TANGE THE THE NEW NEW N V NA TO MANDER  | CONTAGE TOWN OF CONTIDENCE MAINTEN DESCRIPTION   |
| A TO NOTE  |  |
| IMACER, 6-INCH VISIBLE-SPECTRUM METRIC CAMBRA, STEREO UNC 28 APPLICATION   | UP AND DOWN LINK COMMUNICATION NECESSARY TO UPDATE SITE SELEC-   |
|  |  |
| 30 PURPOSE   |  |
| PRIMARY-TO OBTAIN HIGH PRECISION METRIC PHOTOGRAPHY FROM EARTH   | DATA STORED ON FILM AT S/C MUST BE RETURNED TO EARTH   |
| GEODESY AND CARTOGRAPHY. ***SECONDARY-TO PROVIDE SAMPLE PHOTOG-  | IGN NEPERRORES   |
| RAPHY, GEC   | 1) NASA EXPERIMENT IMPLEMENTATION PLAN FOR MANNED SPACE FLIGHT   |
| AND OTHER EARTH RESOURCES DISCIPLINES.   | CAMERA (SPECIAL), OCTOBER 30, 1967.  |
| 31. PRINCIPLES OF OPERATICAL   |  |
| C CAMBRA WILL BE USE   |  |
| ш  |  |
| GRAPHY, TAKEN SIMULTANEOUSLY WITH THE GROUND PHOTOGRAPHY, WILL DEPENDENT OF THE CAMEDA THE   | I 65 HSTORICAL REMARKS   |
| PRIEMBING IND ABSOLUTE SPAILS UNITALISM OF THE CAREAR. THE PRESENT THE PRESENT THE   | THE DIRECTION DEPOS TO A SECURITY OF STREET OF STREET AND STREET OF STREET   |
| SYSTEM CONSISTS OF A 6-INCH POCAL LENGTH (EPL=152 MM) METRIC   |  |
| CAMERA AND A STELLAR REFERENCE CAMERA, HAVING AN EFFECTIVE FOCAL.  |  |
| LENGTH OF 250 TO 300 MM, RIGIDLY CONNECTED IN A POSITION WHICH   |  |
| FEACES 113 COLICER ALLS 13 USC ABOVE THE UNITED AS TROUBLES TO THE DEPOTENTION OF STREET   |  |
| LENS WILL BE EITHER OF THE TOPARON OR WIDE ANGLE TYPE, COLOR   |  |
|  |  |
| PICIENT PIELD ANGLE TO COVER THE 23 X 23 CM FORMAT. SYSTEM   |  |
| RESOLUTION OF 40-50 LINES/AM WILL BE OBTAINED WITH THE GROUND  |  |
| BEGINNING AND END OF THE OVERALL MISSION, WILL BE OBTAINED BY  |  |
| MANEUVERING THE SPACECRAFT SUCH THAT BOTH CAMERAS CAN PHOTOGRAPH   |  |
| FIXED STARS. BOTH CAMER  |  |
| DE BOULFFED WITH FILM CASSETTES, WALCH CAN BE KENOVED BY A   |  |
|  |  |
| SOLAR RADIATION REFLECTED PROM THE SURFACE OF THE BARTH  |  |
| 33. MEASUREMENT RANGE  |  |
| 34. PRECISION AND ACCURACY   |  |
| PREDICTED ACCURACY OF GEODETIC CONTROL OF +- 40 HETERS   |  |
|  |  |

| INSTRUMENT RESUME  | AL RANGE 38. SPECTRAL R  |
|--|--|
| NATIONAL AEKOMAUTICS AND SPACE ADMINISTRATION ELECTRONIDES RESERADINE PENTER CAMBIDINE BANCOMBINET   | 5 5 TO 5   |
| 1, TITLE 2. ACRONYM 3. EXP NO  | במסוו ואס מוו  |
| E TEMPERATURE-SOUNDING EXPERIMENT MTS S  |  |
| (TITLE CONT.)  4. BASSME 5. VARIOR.  11. (10. AG. ) AG. 2  | 42 POINTING ACCUPACY 43, POINTING RATE 44, ALTITUDE 45, INCLINATION 10 DOT GRADE 10 CT POINTING MEDITIN POST GRADE   |
| 6. PRINCIPAL INVESTIGATOR TORGANIZATION  |  |
| NIT  | CARLO EX   |
| S. CO-INVESTIGATOR   |  |
| 12. CONTRACT 13. CONTRACT NUMBER 1.: FLASH INDEX NUMBER 15 STAFT 16 CONTRACT NUMBER 15 DATE 16 CONTRACT NUMBER   |  |
| NA NA  | 50 LB 2. CU FT 30 WATT NONE  |
| 19, AGENCY   | 154. KLEARERGENCE, 25. INTERFERENCE 57. INTERFERENCE 56. INTERFERENCE 56. SHIELDING  |
| TERMILLIGER, R.G. NASA HDOTRS 10SSA/SRB 202-962-05/4   | SENSITIVE:    SOLISTANE   SOLI |
| ON LAB PASADENA, CALIFORNIA NA   | 11 DELAYED TELEMETRY   |
| 26. INSTRUMENT TYPE  26. INSTRUMENT TYPE  10.00.0.1.   | BIT DIGITAL WORDS  |
| PRINCIPLE OFFICE STATE OF STAT | SECONDS TOTALLING 24 BITS/SEC.   |
| APOLLO APPLICATIONS  | A CALLAND AND A CALLAND A CALLAND AND A CALLAND A CALLAND AND A CALLAND A CALLAND A CALLAND A CALLAN |
| ONOTHER BY MIT ON A  | MICROCANTE CONCOR TESS CONSTATIVE ACCIDING THAN TO SENSORS   |
| PRIMARY-TO DESCONSTRATE THE CAPABLETTES AND LIMITATIONS OF MITCHOGRAPH REPORTERS.  | SENSONS EESS SENSIIIVE TO CLOUDS INAM IN   |
| E OF MANY CLOUD IN   | Selver agreement   |
| WHICH BLOCK INFRARED SENSORS.  | 1) EXPERIMENT IMPLEMENTATION PLAN FOR MANNED SPACE FLIGHT PROPERTMENTS - MICBOLLINE TEMPERATURE SOLUTION (S10H) NASA   |
| Lambert and an amount of the contract of the c | 7.   |
|  |  |
| THE INSTRUMENT CONSISTS OF A SINGLE PACKAGE CONTAINING 2 COM-  |  |
| PLETE AND INDEPENDENT RADIOMETERS OF THE DICKE TYPE IN A SUPER-  | LE, HISTORICAL REMARKS   |
| 4 ·  | THE ORIGINAL PROPOSAL WAS SUBMITTED FOR THE APOLLO APP 1A S/C  |
| z  | 174. Olaboranis  |
| PONENTS, LOCAL OSCILLATOR-MIXER-I.T. PREAMPLIPIER, I.F. AND  |  |
| VIDEO CINCUITAT, DATA INTERFACE CINCUITAT, AND FOMES SUFFICIES:  |  |
|  |  |
| S  |  |
| POR TATER TELEMETRY TO THE GROUND. THE ANTENNA BEARGIDTHS WILL   |  |
| SINGNG SIDELUBE SUFFRESSION. WILL BE CALIBRATED AUTOMATICAL  |  |
| USING INTERNAL CALIBRATION LOADS. WHILE THE ANTENNA TEMPERA-   |  |
| X AT 53.5 GHZ AND 210-29   |  |
| 55.0 GHZ, THE DYNAMIC RANGE WILL 3E LARGER TO ACCOMODATE THE   |  |
| CLES ARE MOST SENSITIVE TO TEMPERATURES  |  |
| HEIGHTS OF 4 AND 10 KM. TO CORRELATE DATA AN IR TEMPERATURE  |  |
| SOUNDER SHOULD BE PART OF THE INSTRUMENT COMPLEMENT.   |  |
|  |  |
| THERMAL RADIATION AT 5.5 FR AND 5.6 FR MAYELENGTHS   |  |
| X  |  |
| ***************************************  |  |
| ABSOLUTE ACCURACY = APPROXIMATELY 1 DEG K  |  |
|  |  |

|  |  | The first of the second companies and the second se |
|--|--|--|
| INSTRUMENT RESUL   | INDIKOMENIKESUM.<br>REROMANTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER  | ) TO 35.0 GHZ NA   |
| CAMBRID  | OGE, MASSACHUSETTS   |  |
|  |  | 7  |
| (TITLE CONT.)  | CAPERIDENT SOUT  | DEG /O NE  |
|  | 69,  | 2.0 DEG 0.5 DEG/SECTION CIRCHIAR MEDITIM POSTGRADE   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION  | 8. TELE  |  |
| NICHOLS, G.B. SOUTHERN   | SOUTHERN RESEARCH INST   205-323-6592-x361   | ACTIVE COLING OF TRANSMITTER REQUIRED  |
| GATOR  | -  |  |
|  | [  | YSTRON TRANSMITTERS  |
| TYPE 13. CONTRACT NUMBER   | ATE.   |  |
| МА   | NA INACT PROPOSAL  | 4.2 CU   |
|  |  | Section 1.  |
| LIGER, R.G. NASA   | OSSA/SRB 202-962-  | IC/SEN   |
| 22. VENDOR   | 23 LOCATION 24 DATE 25.LEAD TIME   | NO SEASON OF STATE OF |
|  | N N  | OVER GROUND SITES REALTIME TELEMETRY AS PROGRAMMED   |
|  |  | -  |
| TRANSMITTER, MILLIMETER WAVE   | B PHASE-LOCKED KLYSTRONS UNC   | TEN CHANNELS OF  |
| 10.0   |  | SIGNAL IS  |
| 30. PURPOSE  | AROLLO ARELICATIONS  | EXAMPLE OF THE TOTAL TOURS TO SEE TING DATA AND MENOLEMBERS  |
| PRIMARY-TO DETERMINE STATISTICALLY THE   | CALLY THE ATMOSPHERIC PROPAGATION  |  |
| PARAMETERS THAT ARE IMPORTANT FOR CHARA  |  |  |
| SPACE COMMUNICATIONS PERFORMANCE AT 16   |  | W. REFERENCES  |
|  | )<br>  | IN NASA APPLICATIONS A AND B PHASE B INTEGRATION STUDY DOCUMENT.   |
| 1'   |  | NASA/MSC, APR 1967. ***2) MINZNER, R.A. (ED): INTERIM REPORT ON  |
| _1   |  | SATELLITE METEOROLOGICAL INSTRUMENTS, NASA/ERC PM-6713, JUNE 8,  |
|  |  | 1967.  |
| ONBOARD THE SPACECRAPT THO TRANSMITTERS  | RANSMITTERS, AT 16 GHZ AND 35 GHZ,   |  |
| WILL TRANSMIT SIGNALS TO RESPECTIVE GRO  | PECTIVE GROUND STATIONS. BY MEA-   |  |
| SURING THE AMPLITUDE AND PHAS  | SURING THE AMPLITUDE AND PHASE OF THE RECEIVED SIGNALS MILLI-  | SS, HISTORICAL VEMARAGE  |
| METER WAVE PROPAGATION CHARACTERISTICS   | TERISTICS OF THE ATMOSPHERE WILL BE  | DUE TO DELAY IN AAP APPROVAL. INSTR DRVELOPMENT WAS NOT PUNDED   |
| DETERMINED. THE TRANSMITTED  | RE PRODUCED BY FOUR 16   | P. U. ACRAMS   |
| AND POUR 35 GHZ PHASE-LOCKED   | KLYSTRONS WHICH ARE SEPARATED IN   |  |
| TERPOLITING BY RODONTERFORM AND  | CONTRACTOR ACTION OF STATES OF STATES  |  |
| CHURCHE SEE TO BOTTORY OF THE SEE SEE  | 35 CHZ CROUD INCLUIDES 34 457  |  |
| 2 20 2 4 4 4 5 3 4 4 5 3 4 5 4 5 4 5 5 5 5 5 5   | , 4  |  |
| 11 200 11 000 11 | - E  |  |
| NOTE A CHARACTOR OF CHARACTOR O | -  |  |
| THE DISTRICT OF THE PROPERTY O | LENGTION TOWN THE 230 MILETANTIC 33  |  |
| STEDOOR CA TO TO THE SECOND OF | Out towards to the first and the first to the first to the first of th |  |
| CTONIOTING OF CHARLES OF CHARLES   | SE MALLO GREATER INEN 10 DD. 185   |  |
| THE CONTRACTOR AND DESCRIPTION OF THE STREET   | SISTED WILL BE ABOUT TO US ASSULTING AND SOO MITTERSTON OF   |  |
| DOOD THE TRACES STATES AND SOCIETY   | INTERNAL OF MONORMOND TO STREET  |  |
| THE CARALER  | ב<br>ב   |  |
| H CT GUGGT   | TO DELMEEN CANALER   |  |
| BAND OF / DEG. THE ATTENUATION IS  | T GRIDAGIA   |  |
| 2 TA 5   | TO 0.1 DB (CLEA  |  |
| 32 PHENOMENA OBSERVED  | TRANSMITTED BEARWIDIN 15 ZO DEG.   |  |
| See of 1989 to |  |  |
| 33. MEASUREMENT RANGE TRANSMISSIONS FROM SAT   | FROM SATELLITES  |  |
| 32 20 20 00 00 00 00 00 00 00 00 00 00 00  | 18 16 687  |  |
| 34. PRECISION AND ACCURACY   |  |  |
| AND CO STATE OF STITE OF STATES OF STATES  | 2 na   |  |
| on contract to contract the  |  |  |

|  | 12. SPECTRAL AANOF   |
|--|--|
| NATIONAL AFRONALITICS AND SPACE ADMINISTRATION   | 60.  |
| CAMBRIDGE MASSACHUSETTS  | OF VIEW  |
| 1, TITLE   | 4-30.<br>40. ANGULAR RESOLUTION 41, SPAT 44, RESOLUTION  |
| SR SC  |  |
| 11 / 10 / Kg 00.05   | 2 0 DEG TOUR TOUR TOUR TOUR CONTRACTORS OF ACTUALITY MODITING DOCTORING  |
| 8. TELEPHONE   | AL AEQUIREMENTS  |
| LENOIB, DB. W.B. MANNED SPACECRAPT CENTER 713-483-2221 a. CO-INVESTIGATOR 11. C. ORGANIZATION                                    | OPERATED IN CONJUNCTION WITH SO75 AND SO77; SUPPORT PHOTOS REGION OF COMPONENTS  |
| JET PROPULSION LAB   | RADIOMETER, 2 LOCAL OSCILLATORS, ONF ANTENNA, AND FLECTRONICS  |
| INTRACT NUMBER 14. FLASH INDEX NUMBER 15. START  | 48. WEIGHT 45. VOLUME 30. AVERAGE POWER, SILCTANDSTITATE 1. 20. COMER 53 MTGF  |
| 18. MONITOR 18. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 30 LB Z.O CO TT 10/ WATTES   |
| IGER, R.G. NASA HDOTRS OSSA/SRB 202-962-   |  |
| 22. VENDOM 23. LEAD TIME 23. LEAD TIME NA. M.A. M.A. M.A. M.A. M.A. M.A. M.A.  | SEPTIMEN 21 DESERVATION SECONERY STREET SECONERY SECONERY  |
| NSTRUMENT TYPE   | SUIREVENTS   |
| RADIONETER, 5-CHANNEL MICROWAVE DICKE  | S, EACH SAMPLED TWICE PER SECOND WITH 10 T   |
| APT. PRSP ADDITORS   | ALCUMACT; TO ENGINEERING OUTPUTS, EACH SAMPLED ONCE EVERY TO SEC-<br>MITH 8 BIT ACCURACY, FOTAL OF 108 RITE/SEC.   |
| Pose   | 163 ADVANTAGES AND LANTATIONS  |
| PRIMARY - TO DETERMINE THE TEMPERATURE PROFILE OF THE ATMOSPHERE.  | LIGHT TO MEDIUM CLOUDS WILL NOT AFFECT THE RESULTS AS THEY WOULD BON IN SOMMETICS  |
|  | OA, REFERENCES   |
| CCROWAVE-EMI   | PLICATIONS A AND B PHASE B   |
| METER EXPERIMENT (AAP, WYRRER, SO77), TEMPERATURE PROPILES DOWN<br>TO THE PARTHE CHREACE MAY BE CALCHIAMED.                      | APRIL 1967.***2) MINZNER, R.A. ED.: INTERIM REPORT ON SATELLITE METROPOLOGICAL INSTRUMENTS DA.5713 NASA 255 JUNE 1967  |
| 31. PRINCIPLES OF OPERATION  |  |
|  |  |
| LOCAL OSCILLATORS AND A 10-INCH PARABOLOID ANTENNA WITH HALF-<br>POWER BEAM WIDTH OF 5-10 DEG. THE INSTRUMENT OPERATES CONTING-  | 65. HISTOSICAL REMARKS   |
| T FOR IN   | REVISED VERSION OF AN EXPREMENT (SOUGH) PROPOSED FORMARP A.  |
| (1-4 PER DAY) TO VIRW SPACE. THE INTENSITY OF MICROWAVE RADIA-   | 16 DIASRAWS  |
| SPECTRAL BANDS NEAR 60 GHZ (5 MM MAYELENGTH). ONE SPECTRAL BAND  |  |
| RESONANCE LINE, TWO ARE  |  |
| BELIEBER HEISOGRANCE LINES AND TWO ARE ON THE WINGS OF A STRONG<br>TIME. THERE BANDS RESPOND TO PARTATION MAININ PROM 3 REGIONS. |  |
| DPOPAUSE (15-20 KM), THE STRATOPAUSE (45-55 KM)  |  |
| MESOSPHERE (62-84 KM). THE NADIR BRIGHTNESS TEMPERATURES ARE   |  |
|  |  |
| MATHEMATICAL INVERSION TECHNIQUES ARE USED TO INFER AN ATMOS-  |  |
| PHERIC TEMPERATURE PROPILE. THE VERTICAL RESOLUTION IS ABOUT<br>16 rm in the megosphere, the rantation comes prom a column of    |  |
|  |  |
| EITHER 65 KM OR 130 KM ALONG THE   |  |
| OPON WHETHER THE INTEGRATION TIRE IS 10 OR 25 SECONDS.   |  |
| RICROMAVE RADIATION BRITTED FROM THE EARTH'S SURFACE/ATMOSPHERE.   |  |
| EXPECTED HANGE OF BRIGHTNESS TEMPERATURE = ZERO TO 400 DEG K   |  |
| 34, PRECISION AND ACCURACY RECTRIBUTES FRANCES OF THE PROPERTY OF A KETTER ASCENDE   |  |
|  | The second secon |

|          | 0.007 DEG 100 FEBT FROM 125 NM ALTITUDE 185 INCL. 0.5 DEG 0.03 DEG/SEC LOW CIRCULAR MEDIU | 1 THE LENS SURFACES MUST HE CONFIGURATION DE CONFIGURATIO | GREAT AMOUNT OF SPECIFIC DATA AVAILABLE DUE TO SPECTRĀL SELEC-  A. REFERENCES  A. REFERENCES  1) APPLICATIONS B, PHASE B INTEGRATION STUDY DOCUMENT, NASA/NSC  APRIL 1967.***2) PROPOSAL POR A MULTIBAND SYNOPTIC PHOTOGRAPHIC EXPERIMENT POR MANNED EARTH ORBITTAL HISSIONS, NASA/OSSA,JUNE 10, 1966.***3) MINIBANER, R.* (ED): INTERIM REPORT ON SATELLITE HET-  BOROLOGICAL INSTRUMENTS, PM-6713. NASA/ERC, JUNE 8, 1967.  SE, HISTORICAL REWARKS  DUE. TO DELAY IN AAP APPROVAL, INSTR. DRVELOPMENT WAS NOT PUNDED.  A. DIAGRAMS  A. DIAGRAMS  DOR. TO DELAY IN AAP APPROVAL, INSTR. DRVELOPMENT WAS NOT PUNDED.   |
|----------|---|--|--|
| INGLED N | NOPTIC PHOTOGRAPHY EXPERIMENT  GATOA  THINTERPRETATION  THATTERPRETATION                  | SLATER, DR. P.N. UNIVERSITY OF ARIZONA 602-884-3135  SCONNESSIGATOR  R. ORGANZATOR  R. ORGANZATO | PRIMARY-TO OBTAIN MULTI-SPECTRAL SYNOPTIC STEREOSCOPIC COVER-AGE OVER A SELECTED PORTION OF THE EARTH'S SURFACE FOR THE IDENTIFICATION AND DISCRIMINATION OF SURFACE FEATURES AND CHARDAT OBTAINED BY OTHER REMOTE-SENSOR EXPERIMENTS, SUCH AS IR, BADATA OBTAINED BY OTHER REMOTE-SENSOR EXPERIMENTS, SUCH AS IR, BADATA OBTAINED BY OTHER REMOTE-SENSOR EXPERIMENTS, SUCH AS IR, THIS SYSTEM COMEISTS OF 5 MATCHED 6-INCH FOCAL LENGTH HETRIC CAMERAS (FRAME) AND A SMALLER UV CANERA BORESIGHTED AND SYNCHRONIZED. EACH HETRIC CAMERA LENS WILL BE POCUSED AT INFIRITY WITH A DEGREES ANGLER COMPROL RANGE FROM 1/10 TO 1/500 OF A SECOND WITH AN APERTURE CONTROL RANGE FROM 1/10 TO 1/500 OF A SECOND WITH AN ADERTURE CONTROL RANGE FROM 1/10 TO 1/500 OF A SECOND WITH A MADERIUM CONTROL RANGE FROM 1/10 TO 1/500 OF A SECOND WITH A MADERIUM STATURE CONTROL RANGE FROM 1/10 TO 1/500 OF A SECOND WITH A MADERIUM STATUR. THE MINIMUM EFFECTIVE RESOLVING POWER OF THE MINIMUM SEPRENTING POWER BATE WILL BE VARIBBLE TO PERMIT A MINIMUM OF 10 PER CENT TO A MAXIMUM OF 67 PERRENC CAMERA WILL BE USED: (1) PAN-CHROMATIC-4000 TO 7000 A; (2) NEAR INFRARED-700 TO 10,000 A; (3) NEAR UV-2700 TO 4000 A, PILTERS USED WILL BE USED: (1) PAN-CHROMENA OBSERVED  CHROMATIC-4000 TO 7000 A; (2) NEAR INFRARED-700 TO 10,000 A; (2) NEAR CHROMENA OBSERVED  SEPTIMENT OF SERVED BARREY RANGE FROM TYPES WILL BE USED: (1) PAN-CHROMENA OBSERVED  CHARACTERISTICS.  32. PHENOMENA OBSERVED  33. PHENOMENA OBSERVED  34. PHENOMENA OBSERVED  35. PHENOMENA OBSERVED  36. PHENOMENA OBSERVED  37. PHENOMENA OBSERVED  38. PHENOMENA OBSERVED  38. PHENOMENA OBSERVED  38. PHENOMENA OBSERVED  39. PHENOMENA OBSERVED  39. PHENOMENA OBSERVED  30. PHENOMENA OBSERVED  30. PHENOMENA OBSERVED  31. PRECED INTENSITY, 5 PCT. REGISTRATION, 0.5 RESULTING THE SECOND TO 10,000 |

|          |  | INSTRUMENT RESUME  |  | 35. SPECTRAL RESOLUTION 37. TIME CONSTANT  O. 63 TO 11.0 MTCRONS NA  |
|----------|--|--|--|--|
|          | <b>₹</b>                                 | NATIONAL AERONAUTICS AND SYACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS | NOIL   | IEW 2.3 DEG 26   |
|          | 1. TITLE                                 |  | 2. ACRONYM 3. EXP NO                                     |  |
|          | MULTICHANNEL RADIOMETER                  | METER  | CR SC  | 0.11 DEG 0.4 NM PROM 200 NM ALTITUDE   |
|          | (TITLE CONT.)                            |  | 4. PESUME 5. VLTBION                                     | 45. INCLINATION  |
|          | 6. PRINCIPAL INVESTIGATOR                | 7. ORGANIZATION  | 8. TELEPHONE   | 46. SPECIAL REQUIREMENTS   |
|          | REA, DR. D. G.                           | NASA HEADQUARTERS  | 202-962-5468   | RAWINSONDES REQUIRED, SIMULTANEOUS PHOTOGRAPHY REQUIRED (SO42)   |
|          | 9. CO-INVESTIGATOR                       | 10 OFGANIZATION  | 11. TELEPHONE  | (v) CONPONEATS   |
|          | COLUELL DR. R. ONLER OF                  | UNIV OF CALIF, BERKELEY  | 4.15-845-6000-X1351                                      | 3-CHANNEL RADIOMETER, OPTICS, ELECTRONICS 48 WG18147 69 VOLUME IS A VOLUME IS A NORTH IN STANDON TOWNER IS NOT BE  |
|          | Jd.                                      | NA NA  | INACT PROPOSAL   | 18 LB: 0.8 CU FT 14 WATTS 19 WATTS   |
|          | NONITOR                                  | . 20. P.G.   | 21. TELEPHONE  | 154 1175 PARABERTY 35 INTERPRESSION NUCLEAR 157 INTERPERENCE 157 INTERPERENCE 158 SHIELDING  |
|          | CENTERS, C.D.                            | 0  | SSA/SRB 202-962-0574                                     | SENSITIVE TO BE DETERMINED   |
|          | 22. VENDOR                               | ES LOCATION  | NA NA  | DELAYER DATA REDUCTION DELAYED TRIENTRY AS DROCKAMBE   |
|          | 26. INSTRUMENT TYPE                      |  |  | 737777777777777777777777777777777777777  |
|          |  | 3-CHANNEL TELESCOPIC IR/VISIBLE S  | SIBLE SCANNING PRO                                       | TOTAL DATA RATE IS 25.6 KILOBITS PER SECOND  |
|          | PR CD MPT                                | A DOLLO A  | ABOLTO APPLICATIONS                                      |  |
|          | 30. PURPOSE                              | מים שני מים  | CHOTINGTON   | GE ADVANTAGES AND LIMITATIONS  |
|          | PRIMARY-TO PROVIDE                       |  | NATURE OF THE EARTH'S SUR-                               |  |
|          | PACE AND ON PARTIC                       |  | ATMOSPHERE. * * * SECONDARY-                             | COMPLETE ACCESS TO THE PULL APERTURE OF THE TELESCOPE.   |
|          | TO TEST PRESENT TH                       | TO TEST PRESENT THEORIES OF RAYLEIGH AND MIE   | ND MIE SCATTERING. **                                    | 9. BRV8887.0F6   |
| 1        | TERTIARY-TO MAP CL<br>THERMAL PROPERTIES | _  | HEIGHT, AND GIVE SURFACE .<br>NIGHT.                     | 1) NASA APPLICATIONS A AND B PHASE B INTEGRATION STUDY DOCUMENT.<br>NASA/MSC. APPLI. 1967.***2) REA. D.G.:R. COLWELL. AND K. COULSON:  |
| 73       |  |  |  | ETER FOR THE APOLLO SPAC   |
| <b>)</b> | 31 PRINCIPLES OF OPERATION               |  |  | .U. OF CALIF., BERKELEY, MAR 66.   |
|          | THE INSTRUMENT CONSISTS OF A 6-INCH,     | F/2,   | CASSEGRAIN TELESCOPE                                     |  |
|          | WITH AN IMAGE DISS                       | WITH AN IMAGE DISSECTOR IN THE FOCAL PLANE TO  | PLANE TO DIRECT RADIATION                                | A CONTRACTOR OF THE PROPERTY O |
|          | INTO 3 CHANNELS. T                       | INTO 3 CHANNELS. TUNING FORKS (P=800 HZ) CHOP  | HZ) CHOP EACH BEAM. CHAN-                                | 1.05 HISTORICAL REMARKS  |
|          | PILTERS LIMIT CHAN                       |  | REFLECTED SOCAR KADLACION.<br>MICRONS, AND CHANNET, 2 TO | DUTE TO DELAT IN AAR ARFKOVAL, ANSIR DEVELORDENT HAS NOT FUNDED.   |
|          | 7.9 TO 8.1 MICRONS                       |  | INEL 3 PASSES EARTH-EMITTED                              |  |
|          | RADIATION IN THE 1                       | 0-11 MICRON BANGE, POLAROID  | POLAROID DISKS ROTATING AT                               |  |
|          | 111 RPS DETERMINE                        | 111 RPS DETERMINE POLARIZATIONS OF THE BEAMS   | BEAMS IN CHANNELS 1 AND                                  |  |
|          | 2. AN OSCILLATING                        | 2. AN OSCILLATING MIRROR PLACED IN FRONT OF THE TELESCOPE A  | THE TELESCOPE AT   |  |
|          | TRACK THE SCAN S                         | THE SCAN SPERD AND AMPLITUDE ARE CHOS  | RECHOSEN SO THAT ADJACENT                                |  |
|          | STRIPS ARE CONTIGU                       | · 🛱  | IMAGE CAN BE CON-  |  |
|          | STRUCTED. THE DET                        | STRUCTED. THE DETECTORS ARE 20-ELRMENT LINEAR ARRAYS,  | R ARRAYS, SILICON  |  |
|          | FOR CHANNELS 1 AND                       | P4 5   | OR CHANNEL 3. PREFLIGHT                                  |  |
|          | REDITCHTON A TOOK                        | THE FIRST TWO CHANNELS ARE U   | AND AT A HONFYCOMB RIACKT                                |  |
|          | BODY FOR A HIGH TE                       | RODY POR A HIGH TEMPERATURE CALIBRATION ARE TAKEN POR THE  | A HONELCOMB BEACK-                                       |  |
|          | CHANNEL. INTENSIT                        | IES ARE MEASURED TO 0.5 PER  | 0.5 PERCENT OF THE MAXIMUM                               |  |
|          | SIGNAL. A FOUR-ST                        | IGNAL. A FOUR-STEP AUTOMATIC GAIN CONTROL AVERAGES   | VERAGES THE BRIGHT-                                      |  |
|          | 32. PHENOMENA OBSERVED                   | E  | E GAIN ACCORDINGLY.                                      |  |
|          | INTENSITY/POLARIZA                       | INTENSITY/POLARIZATION OF REFLECTED SOLAR AND EMITED RADIATION                                     | EMITED RADIATION   |  |
|          | ALBEDO O TO 0.85;                        | ALBEDO 0 TO 0.85; POLARIZATION 0 TO 0.40; TEM  | TEMP 200 TO 300 DEG K                                    |  |
|          | 34. PRECISION AND ACCURACY               |  |  |  |
|          | ALBEDO AND POLARIZ                       | ALBEDO AND POLARIZATION WITHIN 0.01; BRIGHTNESS TEMP +- 1 DEG K                                    | SS TEMP +- 1 DEG K                                       | THE PARTY OF THE P |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | SECTION OF ST.O DEGIGO NH BY 60 NH FROM 125 NM ALTITIDE   |
|--|---|
| 1. TITLE MULTISPECTRAL TERRAIN PHOTOGRAPHY EXPERIMENT MTP S101 (TITLE CONT.) 4. RESUME   5.14.0.1  | USBEC 30 METERS (100 PEET) FROM 125 NM ALTITUDE   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE SLATER DR. P. N. UNIVERSITY OF ARIZONA 602-884-3136 8. CO-INVESTIGATOR 10. ORGANIZATION 1. TELEPHONE                                      | 1.5 DEG .03 DEG/SEC: LOW CIRCULAR MEDIUM POSIGRADE  SECULATION WITH HIGH SPECTRAL TRANSMISSION FROM 0.3 TO 1 MICRON  COLUNDARYS |
| 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. START   | CAMBRAS, 18 MAGAZINES, CONTROLS WE GAT 14 VOLUME TO AVENAGE FOWER 18 18 1.0 · CU FT, NONE NONE                                  |
| 18. MONITOR 19. AGENCY 20.PGM OFFICE 21. TELEPHONE TERRILLIGER, R.G. NASA HDQTRS OSSA/SRB 202-962-0574 22. VENDOR 22. VENDOR   | SE 18 INTERRUPENCE SO INTERREFERING DT. INTERREPRENCE SON SON SON SON SON SON SON SON SON SON                                   |
|  | TURN ON COMMAND   |
| IMAGER, VISIBLE HASSELBLAD 500-EL PRAME-CAMERA 28. APPLICATION  BRSP, MRT  APOLLO APPLICATIONS   | REAL TIME VOICE COMMUNICATIONS ARE DESIRED TO RELAY DATA ON FILM USAGE, TARGET CONDITIONS, WEATHER, AND SO PORTH.               |
| PRIMARY-TO OBTAIN MULTISPECTRAL COVERAGE OVER A SELECTED PORTION   | 62. ADVANTAGES AND LIMIT VIEWS  |
| OF THE BARTH'S SURFACE FOR THE IDENTIFICATION AND DISCRIMINATION OF SURPACE PRATURES AND CHARACTERISTICS AND TO OBTAIN PHOTO-  |   |
| GRAPHI FOR APPLICATIONS ALKEADI DERONSTRATED. ***SECONDARY-TO PROVIDE DATA FOR CORRELATION WITH AN INTERPRETATION OF RESULTS OF OTHER REMOTE SENSORS.  | 1) MASA-EXPERIMENT IMPLEMENTATION PLAN FOR MULTISPECTRAL PHOTOGRAPHY/(S101), OCT. 1967.   |
| 3), PRINCIPLES OF OPERATION  BITS SPEEDS CANADATED OF STREETINGS CANADAS CONTROL OF STREET   |   |
| THE JOYLE OWNERS OF SAN MAICHED CARERAS BOKESLIGHTED AND SIN-<br>CHRONIZED TO EACH OTHER AND TO OTHER SENSORS IN THE SPACECRAFT<br>SYSTEM AS REQUIRED BY THE MISSION. THE CAMERAS ARE HASSELBLAD | GE. HISTORICAL REMARKS  |
| SES. THE .3 MICRON TO A TO 1500 A  | THIS EXP IS SIMILAR TO SO65 WHICH WAS FLOWN ON APOLLO 9.  |
| WIDE WITH SHARP CUTOPF AND HIGH TRANSMISSION CHARACTERISTICS (GREATER THAN 90 PERCENT AT MAXIMUM TRANSMISSION). PILTERS ARE RITHER OPTICAL FLATS OR PRECISION MENICUIS SHADES AND ARE DER-       |   |
| MANENTLI INSTALLED PRIOR TO FLIGHT TINE. THE SHUTTER IS OF THE INTRA-LENS, HIGH-EPPICIENCY TYPE WITH AN EFFECTIVE SPEED RANGE  |   |
| A WILLIAM OF 10 PERCENT OVERLAP ON A DALCENT PHOTOGRAPHS OF THE CHIMMEND OF 10 PERCENT OVERLAP ON ADJACENT PHOTOGRAPHS.  |   |
|  |   |
| A) , NEAR 1  |   |
| 32. PHENOMENA OBSERVED   |   |
| REFLECTED SOLAR RADIATION PROM THE SURFACE OF THE EARTH  |   |
| ADJUSTS FOR AVERAGE SCENE BRIGHTNESS UP TO A PACTOR OF 1200  |   |
|  |   |

| INSTRUMENT RESUME  | 35. SPECTRAL HESOLUTION 33. TIME CONSTANT 0. 44 TO R.O. GHZ                       |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS AND SPACE ADMINISTRATION ELECTRONICS ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSOCIATED ASSO   | VIEW 39.  |
| CAMBRIDGE, MASSACHUSETTS  1. TITLE  (2. ACRONYM, 3. EXPINO   | SUANGULAR RESOLUTION STATIAL RESOLUTION   |
| ALTIMETER/SCATTEROMETER  |   |
|  | TITUDE 145. INCLINATION   |
| A DELINCIPAL INVESTIGATION STEEPHONE   | 46 SPECIAL REQUIREMENTS   |
| UNIVERSITY OF KANSAS   |   |
| 9. CO-INVESTIGATOR 10. ORGANIZATION - 11. TELEPHONE  | . 1   |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. START 16. CONTRACT STATUS  |   |
| NA NA  |   |
| 19. AGENCY   | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING |
| CENTERS, C.D. NASA HDOTRS OSSA/SRB 202-962-0574  | SOURC/SEN   |
| NA   | AND INTERNAL MANNED RETURN  |
| i i  | 1 1   |
| ALTINETER/SCATTEROMETER, RADAR PULSE SYSTEM PAN BEAM ANTENNA ONC. 28 SPACERAFT   |   |
| OL. CART   |   |
|  | 63. ADVANTAGES AND LIMITATIONS  |
| -TO PROVIDE RADAR-ALTIMETER-SC   |   |
| *** SECONDARY - TO DESITE ALTITUDES FOR THE STUDY OF EARTH RESOURCES.  | 64. RECERENCES  |
| PYDR   | 11 NASA EXP. TRDIENENTATION PLAN POR A RADAR ALTIMETER/SCATTER-                   |
| ***************************************  | B 35  |
| 31 PBINCIPLES OF OPERATION   | INTERGRATION STUDY DOCUMENT. NASA/MSC, APR 67.***3) MOORE, R.K.E.                 |
| FINALLES OF PERMINDING   |   |
| TOLO EARBAIDENE USES A CONDINCH ABBIENCIEN SON STATE   | Sonface. U nansas,  |
| ANTERNA,   | 65. HISTORICAL REMARKS  |
| - 4  | THIS RESUME IS PURPOSELY GENERALIZED DUE TO THE INACTIVE STATUS                   |
| S NARROW IN  | is Diagrams   |
| RECTION, AND EXTENDS PROM THE SUBSATELLITE POINT OUT TO A DIS-   |   |
| TABCE CORRESPONDING TO AN INCIDENT ANGLE OF 30 DEG. THE INITIAL,   |   |
| ETRY AND FOR M   |   |
| SCATTERING CORPTCIENT AT AND NEAR THE VERTICAL. SUBSEQUENT   |   |
| GROUND BRETOKES ARE FROM LONGER HANGES AND TREREFORE ARE FROM TODOURS OF TREEFERS AND TREEFERS OF TREE |   |
| PRIME AT SELECTED POINTS, THE RELATION OF SCAT-  |   |
| TERING CORPPICIENT TO, ANGLE CAN BE ESTABLISHED FOR DIFFERENT  |   |
| OF THE COZ LINES THOS REDOCING THE 712 INV CH CHANNEL WIDTH TO   |   |
| WIDTH TO 1.6 INV   |   |
| D MODE FOR THE ALTIMET   |   |
|  |   |
| TO 1.0 INV CM FOR  |   |
| AND U. 83 INV CH YOR THE OTHER. THE DETECTORS AND THERMISTOR   |   |
| RETURN OF SPACECRAFT-EMITTED RADAR PULSES  |   |
| 33. MEASUREMENT RANGE  |   |
| VANCING APPLICATIV   |   |
| A. THEUSION AND ACCOUNT  |   |
|  |   |
|  |   |

2 TRANSMITTER/RECEIVERS, 2 ANTENNAS, POWER SUPPLY, FILM RECORDER MANNED SPACEFLIGHT, OCT 67.\*\*\*2) APP A AND B PHASE B INTEGRATION STUDY DOCUMENT, NASA/MSC, APE 67.\*\*\*3) MOORE, R.K.ET.AL: PROPOSAL FOR AN IMAGING RADAR FOR MANNED SPACECRAPT TO STUDY THE EARTH'S POTENTIAL RESEARCH 61. FREQUENCY OF OBSERVATION RESUME IS PURPOSELY GENERALIZED DUE TO INACTIVE STATUS OF INSTR SURFACE, U KANSAS, 1966.\*\*\*4) MOORE, R. ET.AL. POTENTIAL RESEARCAND EARTH RESOURCES STUDIES WITH ORBITING RADAS. ALAA OCT. 1967 ANTENNA BEAMS MUST POINT HP 30 DEG IN DIR NORMAL TO S/C MOTION 1) NASA EXP. IMPLEMENTATION PLAN POR A RADAR IMAGER SYSTEM POR 12. TIME CONSTANT ON COMMAND 45. INCLINATION MEDICAM 36. SPECTRAL RESOLUTION ATTENDENCE 105 INTEREFRENCE 106, INTERFERENCE 57. INTERFERENCE 58. SHIELDING CIRCULAR 60. DATA RECOVERY PILM RETURN 44. ALTITUDE RADAR HAS ALL-WEATHER CAPABILITIES. 39. GROUND SWATH LOW 40 KM MANAGE TO THE TOTAL THE PRESENCE OF THE MANAGEMENT OF THE PRESENCE OF THE PRES AZ POLITINO DEC. BACK, 143. POINTING RATE 63. ADVANTAGES AND LIMITATIONS 02, TELEMETAY REQUIREMENTS 46, SPECIAL REQUIREMENTS 65. HISTORICAL REMARKS To HEFERENCES SOURC/SEN SO. CALIBRAT 1. HITTER/RECEIVERS, 2 ANTENNAS, AND ASSOCIATED EQUIPHENT. THE SYSTEM EMITS A CONTINUOUS SERIES OF PULSES OF MICROWAVE FREGUENCIES IN THE X BAND (AROUND 15 CM) AND X BAND (AROUND 15 CM). THE SYSTEM WOULD BE COHERENT AND UTILIZE A SYNTHETIC-ARERURE ANTENNA OF THE UNPOCUSSED IYPE WITH RADIATED BURSTS ILLUMINATING AN AREA OFF TO ONE SIDE OF THE SPACECRAPT'S GROUND TRACK (SIDE-LOOKING)
ANTENNA POINTING ANGLE WOULD NOMINALLY BE 30 DEG FROM THE NADIR
WITH THE ANTENNA RIGIDLY MOUNTED TO THE EXPERIMENT PLATFORM.

BACH ANTENNA WOULD CONSIST OF A SLOTTED ARRAY MADE UP OF A NUMBER OF ELEMENTS, EACH ELEMENTS BEING A PIECE OF RECTANGULAR WAVE 2.ACRONYMI 3. EXPINO THE IMAGE SO RECORDED IS NOT DIRECTLY INTERPRETABLE BUT REQUIRES ADDITIONAL GROUND (SYNTHETIC APERTURE) PROCESSING TO PROVIDE A CONTINUOUS STRIP RADAR IMAGE. 11/10/69 0005 IMAGER, SIDE-LOOKING RADAR SYNTHETIC APPRIURE PHASE COHERENT UNC GUIDE SLOTTED FOR RECEIVING AND SENDING VERTICAL POLARIZATION IN ING SEPARATELY THE REPLECTIONS RECEIVED AT DIFFERENT INTERVALS OF TIME APTER THE BURST IS INITIATED, THE RETURNS COMING PROM DIFFERENT GROUND DISTANCES OUT TO THE SIDE CAN BE SEPARATED OUT. REPRESENTATIVE SIDE-LOOKING RADAR IMAGER CONSISTS OF 2 TRANS-ONE ANTENNA AND HORIZONTAL POLARIZATION IN THE OTHER. BY STOR-0SSA/SRB 202-962-0574 RADIN S106 PRIMARY-TO SPACE-QUALIFY THE RADAR IMAGER AT ORBITER ALTITUDES \*\*\*SECONDARY-TO PROVIDE INITIAL DATA POR THE STUDY OF EARTH RESOURCES FROM SPACE. TO PROVIDE A BASIS FOR THE DESIGN OF SUCCEEDING BARTH-ORBIRAL RADAR IMAGING EQUIPMENT AND INACT PROPOSAL 17. STATUS APOLLO APPLICATIONS 913-864-3441 913-864-3441 11. TELEPHONE PO. PGM OFFICE 21. TELEPHONE S. TELEPHONE ΝA NATIONAL AEKUNAU (102 ANJ SPACE ADMINISTRATION ELECTRONICS RESLAKUH CENTER CAMBRIDGE, MASSACHUSETTR KANSAS STANT Z UNIVERSITY OF KANSAS INSTRUMENT RESUME 14. PLASH INDEX NUIZBER RADAR RETURNS FROM THE EARTH'S SURFACE ELLERMEIER, DR. R.D. UNIVERSITY OF ; NASA HDOTRS 7 GHGANIZATION i 19 ORGANIZATION NA 19. AGENC NSR 17-004-003 PRINCIPLES OF CPERATION PRECISION AND ACCURACY 6. PRINCIPAL INVESTIGATOR MEASUREMENT RANGE CENTERS, C.D. RADAR IMAGER MOORE, DR. R EXPERIMENTS. Ž 28, APPLICATION INSTRUMENT (TITLE CONT. MONITOR 30. PURPOSE 22. VENDOF TITLE

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE AOMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | 35 SPECTRAL RANGE 36 SPECTRAL RESOLUTION 37 TIME CONSTANT 14.5 TO 15.0 KICRON 5.6 PERCENT 1. MILLS BC 18. FIELD GF VIEW 38. GROUND SWATH 10. |
|--|--|
| 1, TITLE 2.ACRONYM 3. EXP NO   | AH HESOLUTION 41 SPATIAL RESOLUTION  |
| SELECTIVE CHOPPER RADIONETER SCR SOGO  | 10. DEG 35 NN FROM 200 NM ALTITUDE; VERTICAL=5 NN  |
| PALINVESTIGATOR 3. OFGANIZATION REFERENCE  | EMENTS   |
| ALSO OXPORD UNIVERSITY, ENG.   | IR DATA REQUIRED FOR CALCULATIONS OF VERTICAL TEMP PROFILES  |
| JOINT PI READING UNIVERSITY, ENG.  | TERS, MIRROR, DETECTOR, BLECTRONICS  |
| NA NA INACT NUMBER 1.1 FLASH NUMBER 3. DATE NO. DATE NO. DATE NO. DATE NA INACT PROPOSAL   | 34 LB 0.5 CU PT 5 WATTS 1 WATT   |
| 19. AGENCY 20.PGM OFFICE   | 194. WYFRPERRYCE 39. INTERFERENCE 36. INTERFERENCE 37. INTERFERENCE 38. SHIELDING  |
| TERMILLIGER, R. INASA HUUTKS 1055A/SAB 202-962-05/4  |  |
| 38. INSTRUMENT TYPE  | ONCE/ORBIT, AERO AND BB DELAYED TELEMETRY CONTINUOUS   |
| 3, 3 DUAL-CHANNEL IR   | 6 ANALOG CHANNELS ARE REQUIRED (8 BITS/WORD, SAMPLED ONCE EACH   |
| MET APPLICATIONS APPLICATIONS  | SECOND).   |
|  | ATIONS   |
| PRIMARY-TO DETERMINE ON A GLOBAL SCALE THE THREE DIMENSIONAL TEMPERATURE STRUCTURE OF THE EARTH'S ATMOSPHERE REMERN THE  | BETTER SPECTRAL RESOLUTION THAN CONVENTIONAL SPECTRONETERS OR INTERPREDMETERS. LIMITED TO ABOVE CLORDS.                                      |
| GROUND OR HIGHEST CLOUD TOP AND 50 KM ALTITUDE THROUGH THE USE   |  |
| OF THE 15 MICRON ABSORPTION BAND OF CO2.   | 1) SMITH, E.W.: SCR SUBSYSTEM DIRECTORY G.E., PHIL. PA. PEB 68.  |
|  | NASA/ERC PM-6713, JUNE 1967.***3) GOLDBERG, I.L.: MET IR INSTRU-   |
| The state of the s | 13TH ANN TECH SYMP OF  |
| EACH OF 5 CHANNELS IS CHOSEN TO SARPLE THE TEMPERATURE AT A DIFF. PERENT HETGHT IN THE ATMOSPHERE. (HIGH MAYE NUMBERS SAMDIE LORER   | AUG 1968.***4) APPLICATIONS A AND B PHASE B INTEGRATION STUDY  |
| 122  | 68. HISTORICAL REMARKS   |
| NICUES, THE VERTICAL TEMPERATURE PROFILE AT 10 KM INTERVALS CAN  | STRILAR INSTRUMENT ON NIMBUS D. ALSO PROPOSED FOR NIMBUS P.  |
| BE INTERKED. INTERFERENCE FILTERS BETERNINE THE SPECTRUM IN RACH CHANNEL. 3 CHANNELS WITH CENTER WAYE NUMBERS AT 675, 967.   | Charleton  |
| AND 712 INV. CM USE FILTERS WITH A HALF BANDWIDTH OF 10 INV. CM  |  |
|  |  |
| TIVITY EVEN MORE THE RADIATION IN EACH CHANNEL IS PASSED THROUGH.  |  |
| A CELL CONTAINING CO2, FOR THE 3 WIDE BAND AND ONE NARROW BAND CHANNES THE DASS CALCES THE ACCOUNTS OF THE CONTEST DOSTEON   |  |
| <u>.</u>   |  |
| 6.6 INV.CM, THE 697 CHANNEL HIDTH TO 2.2 INV.CM, THE 675 CHANNEL WIDTH TO 4 INV. CM AND A 668 CHANNEL WIDTH TO 1.6 INV.CM. THE   |  |
| WEEN 2 CO2 CELLS. OF   |  |
| RADIATION FROM THE WINGS OF CO2 ABSORPTION LINES IS CHOPPED;   |  |
| PECTORS ARE  |  |
| BOLOMETERS SAMPLED ONCE PACH SECOND.   |  |
| IR RADIATION EMITTED PROM THE BARTH'S ATMOSPHERE.  |  |
| 200 DEGREES K TO 280 DEGREES K   |  |
| 0.5 DEG K BELOW 3 NM AND 2 DEG C BETWEEN 10 NM AND 20 NM   |  |
| 200 00 00  |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS           | AS SPECTAN, AGALUTION (T. L. CONSTA<br>TO 2.5 NICRONS            |
|--|--|
| 1. TITLE   | O. 1/ DEG. O. T. T. DEG. O. 4 NO BY O. 9 NO FROM 140 NO ALTITUDE |
|  | O NM ALTITUDE (SCA   |
| 11/10/69   | 2.0 DEG 0.40 DEG/SEC LOW CIRCULAR MEDITIM POSTGRADE              |
| STIGATOR 7. ORGANIZATION 8. TELEP  |  |
| LOWE, D.S. UNIVERSITY OF MICHIGAN 313-483-0500-X218 s. co-investigator in telephone  | INSTRUKENT MUST BE BORESIGHTED WITH IMAGERS FOR CORRELATION      |
|  | ETER, COOLANT, RECORDER  |
| TYPE! 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE  | A MONTH STATE TO SELECT TO SELECT POWER                          |
| IN IN ACHION IN AGENCY 20, PGM OFFICE 21, TELEPHONE  | 50 L9 2.0 CU FT 48 NATUS 20 WATTS 65 WATTS                       |
| IGER, R.G. NASA HDQTRS OSSA/SRB 202-962-0  | SENSITIVE  |
| 22 VENDOR 23 LOCATION 24 LOTE 72 LEAD TIME   | 60. DATA SECOVERY  |
| 26. INSTRUMENT TYPE  | DI STANDAKULAGU, GARKS DEBATED TELEBETHY AS PROGRAMMED           |
| TRB, SHORT-WAVELENGTH VISIBLE/NEAR-IR  | HOUSEKEEPING CHANNELS SAMPLED BYERY SECOND POR A TOTAL           |
| 28, APPLICATION ADDITO ADDITONE  | BITS PER SECOND. TWO DATA CHANNELS EACH PROVIDING 3400 BITS      |
| OSE  | SA ADVANTACES AND LIMITATIONS                                    |
| PRIMARY-TO DETERMINE IP SPECTRA OF TERRAIN FEATURES OBTAINED   |  |
| PROD SPACE THROUGH MAJOR ATMOSPHERIC WINDOWS CAN BE CORRELATED MITH CROHND WIRD GOVERNMENT AND SCAPEDING                       | 97. SERIES (1997)  |
| BSORPTION EFFECTS OF THE INTERVENING ATMOSPHE  | 1) NASA-EXPERIMENT IMPLEMENTATION PLAN FOR MANNED SPACE PLICHT   |
|  | ER (S103),   |
| 31. PRINCIPLES OF OPERATION  |  |
| ا <i>ـ</i>   |  |
| TELESCOPES BACH HAVING AN APERTURE OF 4 IN AND A FOV OF 3 MILLI-   | 65 HISTORICAL BENARKS  |
| VEL 0.42 MI DUBING   | DUE TO DELAY IN AAP APPROVAL, INSTR DEVELOPMENT WAS NOT FUNDED   |
| MINIMUM TARGET SIZE  | its, DIAGRAMS  |
| (UNITORE, HOROGENEOUS AREA) IS A 1 NE BY .5 NE RECTANGLE. THE SPECIFICAREMENT OF A BILL OF SPECIF                              |  |
| VARIETY OF TERRAIN PEATURES. EACH SPECTRA WILL CONSIST OF 100  |  |
| SAMPLINGS, AT A SCAN RATE OF 10 SPECTRA PER SEC. SPECTRA WILL BY DESCRIPE BY TIPLE WAS AND AND AND AND AND AND AND AND AND AND |  |
| DE EACH :  |  |
| REGION INTO 30 PARTS.) THE SHORT WAVELENGTH CVP WILL BE A COM-   |  |
| POUND DEVICE WHEREIN EACH HALF COVERS THE .4-0.75 MICRON AND 0.7-1.35 MICRON REGIONS RESPECTIVELY. THRRE DETECTORS WILL BE     |  |
| Ē  |  |
|  | -  |
| A BINKOR CHOPPER WILL BE USED TO TIME SHARE THE BEAR BEIMERN THESE 2 DETECTORS IN SYNCHRONISM WITH THE COMPOUND CVP. A THIRD   |  |
| LID CO2) WILL BE USED  |  |
| THE 1.3 TO 2.5 MICRON REGION. 32. PHENOMENA OBSERVED   | -  |
| REFLECTANCE OF VISIBLE AND NEAR-IR RADIATION FROM TERRAIN  |  |
| 33. MEASUREMENT HANGE DAYBORDS TITTED OF OACO THE FOLLOWING THE COLUMN CHECKED THE MATCHON                                     |  |
| .UUUU3 IU .U3 WA11/  |  |
|  |  |
|  |  |

| INSTRUMENT RESUME   | TO .7 MICRON NA  |
|---|--|
| CANDONAL ABROUND IS AND SABLE ABMINIST HATTON ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS                              | JUNE SWATS   |
| 2. ACRONYM  | AT. A. 5 250   |
| STELLAR REPRACTION DENSITY MEASUREMENT SRDM   SADM   SOUT   | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  |
| 11/10/69  | .05 DEG/SEC LOW CIRCULAR MEDIUM  |
| 7. ORGANIZATION 8. TELEP  |  |
| PISCHBACH, DR. F.P. UNIVERSITY OF MICHIGAN 313-764-6565 s. co-investigator  | GIRO DRIFT L 0,05 DEG/HR; OPERATES DURING NIGHT PHASE ONLY   |
| ONTRACT IS SAUTHER A CLASSIANCE NIMBER IN CLASSIANCE IN START IS CONTINUED.   | 2 STAR-TRACKING TELESCOPES, 2 GYROSCOPES, MONITORING PANEL   |
| NA NA NA NA NA NA NA NA NA NA NA NA NA N  | 110 LB 6.0 CU FT 65 WATTS 104 WATTS  |
| 19. AGENCY 20. PGM OFFICE 21. TELEPHO   | SA INTRAFESCE SO INTRAFASCE INTAFASCE INTRAFASCE INTRAF |
| TERRILLIGER, R.G.   NASA HDOTRS   OSSA/SRB   202-962-0574   | BA CALLEBANTION OF DATA PRODUCESY ACCUIRED AGAINST VIS RAD   |
| NA NA   | DELAYED TELEBETRY 4 STAR TRA   |
| SERINSTRUMENT TYPE SERINSTRUMENT TYPE SCHALL TO TRACTOR INC.  | 1 KILOBIT DER STOOND DIRING PACH LO SECOND OCCUITANTION POLIS OR   |
| 20 SPACECRAFT   | THE EXPERIMENT IS CONDUCT  |
| MET APOLLO APPLICATIONS   | 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1   |
| -TO TEST A TECHNIQUE POR OBTAIN   | S/C MUST MANRUVER TO ACQUIRE EACH STAR, SIMULTANEOUS RADIOSONDE  |
| MOSPHERIC DENSITY PROFILES (AND THUS TEMPERATURE AND PRESSURE   | DATA_IS_REQUIREDINSTRUMENT_REQUIRES_30_MINUTE_WARM=UP_RERIOD   |
| BI BENDOMING IND REFRACTION ANGLE OF LIGHT<br>PREING OCCULTED BY THE EARTH, RESULTING PRO                                       | _  |
| WITH THOSE FROM RADIOSONDES.  |  |
| INPORMATION ON BACKGROUND RADIANCE NEAR THE HORIZON.  | STRUCTURE BY REFRACTION STAR TRACKING TECHNIQUE, (PROPOSAL).   |
| THIS EXPERIMENT USES AN AUTOMATIC, GIMBALLED, STAR-TRACKING   | CORE 1200, U. OF BLUIGHN.  |
| DATA TELESCOPE WITH 150-INCH POCAL LENGTH, P/15 SCHMIDT CASSE-  |  |
| GRAIN OPTICS AND AN ITT P4012 VIDISSECTOR PHOTOTUBE, THE IN-  |  |
| THE STAR AND AI   | MODELLO VERBALLAN BARENAR ERAVERALAN MOLIMINIAN EBANT. JAHULIN KALAN KALAN KALAN KALAN KALAN MAMMAMANAN MOLIMINIAN KALAN KALAN MAMMAMANAN MOLIMINIAN KALAN KAN KALAN KALAN KAN KALAN KAN KAN KAN KAN KAN KAN KAN KAN KAN K   |
|   |  |
| A 2 DEG FIELD. IN OPERATION AN ASTRONAUT SELECTS AN OCCULTING   |  |
| CKER  |  |
| INTER, CONTROL IS SHI   |  |
| TO THE DATA TELESCOPE MHICH TRACKS TO ITS CENTER MITHIN A FEW<br>ARCHARC. GYROS MOUNTRD ON THE TRIESCOPE THRE ARE INCAGED AND   |  |
| MEASURE THE TUBE'S MOTION AS THE STAR IS TRACKED. REFRACTION  |  |
| ANGLES INCREASE PROF O TO 40 ARCHMIN DURING OCCULTATION WHICH<br>TAKES AROUT 40 SEC OF TIME. SINCE THE TRIESCOPE IS TOO MASSIVE |  |
|   |  |
| TO THE GYRO O   |  |
| JUN EQUALS THE INSTANTANCOUS ANGLE OF REFRACTION. AN INVERSION TECHNIQUE GIVES THE INDEX OF REFRACTION AT THE RAY'S TANGENT     |  |
| POINT TO THE EARTH PROM WHICH A DENSITY PROFILE IS DEDUCED.   |  |
| STELLAR REFRACTION ALONG TWO AXES (ELEVATION AND AZIMUTH)   |  |
| ACQUIRE STARS OF HAGNITUDE 1 TO 5; TRACK THRU BANGE OF 1 TO 8 M   |  |
|   |  |
| STAR TRACKER ACCURACY IS 2 SEC OF ARC RHS   | Andread and the state of the st |

| NSTRATION<br>In  | 153  |
|--|--|
|  | DO (1) A NA NATH ISO CAOUND SWATH  |
|  |  |
| E.AGRONYM 3. EXPINO  | יט איס איז איז איז איז איז איז איז איז איז איז   |
| UHF-SPERICS DETECTION EXPERIMENT   | SEE ITEM 31 NA   |
| 11/10/69, 0003   | LOW CTRCHLAR   |
| T  | L AEQUIRÉMENTS   |
| S.A. NATL CTR FOR ATMOS RES 303-444-5151   |  |
| TO THE PHONE   | A COMPONENTS   |
|  | UHE, KECETALEK, ANTENNA SISTEM, STONAL-PROCESSING UNIT   |
| NA NA  | 33 LB. 0.9 CU FT S HATTS BRAND 6 WATTS   |
| C. SW OFFICE 2) TELEPHONE COMPS OF STATE STATE COMPS OF STATE COMP | COLDE / STRUCTURE AND INTERPREDENCE 130, INTERPREDENCE 137, INTERPREDENCE 100 SHIELDING  |
| 22 LOCATION CASAL AND LANGE TO THE SELENT TIME TO THE  | SOURCE SERVENCY OF OBSERVATION (SO. DATA RECOVERY  |
| NA   |  |
|  | The state of the s |
| RECEIVER, UHF LOW-NOISE  | T BUFFERED DIGITIZER OUTPUT CONTAINER BAND TO BIT MORDS PER  |
| APOLITO APPLICATIONS   | 177-0<br>1 38 00   |
| RPOSE.   | IONS   |
|  | A HIGHER INCLINATION WOULD PROVIDE MORE CLASSES OF THUNDERSTORMS   |
| DETERMINE THE GLOBAL DISTRIBUTION OF THUNDERSTORM ACTIV-   | WOULD PROVIDE STRONGER S   |
|  | - 1  |
| -<br>  | 1) APPLICATIONS A AND B PHASE B INTEGRATION STUDY DOCUMENT. NASA/  |
| SMAY   | MSC, APRIL 1967. ***2) ROSSBY, S.A. AND NELSON, D.A.: MEASURENET   |
| BE USED TO INDICATE THE DEVELOPHENT OF INTENSE CONVECTION.   | OF SPERICS FIRED STRENGTH FROM A SATELLITE. SEPT. 1966.***3) MASA  |
| A TOU NOTED HED DEFETURE MINER AD 640 MUS UTAN   | BAFERINESS INTERESTED FOR FOR OUR SERVICE FELLING 19540).  |
| CHRICH ARE DEFECTED  |  |
| PERS AT THE VIDEO OUTPUT OF A LOCARITHMIC IF AMPLIFIES AND ARE   | 65. HISTORICAL REMARKS   |
| CRIMINATING ELECTRONICS.   | DIE TO DELAY IN AAP APPROVAL, INSTR DEVELOPMENT WAS NOT PUNDED.  |
| ~  | PS. DIACKAMS   |
| CAVITY-BACKED PLANAR ARCHIMEDEAN-SPIRAL ANTENNA, THE SYSTEM  |  |
| NOISE PIGURE WILL BE LESS THAN 3 DB. THE AMPLITUDE OF THE  |  |
| LARGEST SFERIC IN EACH 100 MILLISEC SAMPLING INTERVAL WILL BE  |  |
|  |  |
| SINGLE   |  |
| MICROSEC) OR WHETHER IT WAS ASSOCIATED WITH A BURST OF PULSES  |  |
| LATTER IS CHA!   |  |
| ALLI ASSOCIATE HID LIGHTINIC DOL NOT HORSE. INT AND DOSAM DESCRIPTION TO THE WILLIAMS AND DESCRIPTION OF HIS BOUND HIS BOUND HERE.   |  |
|  |  |
| DEVELOPED AND WILL BE INCORPOR   |  |
| NARROW BEAM, 20-25 D   |  |
|  |  |
| DEG, (UNMANNED OPERATION) IN THE OTHER MODE.   |  |
| 32 PHENDMENA ORSERVED  |  |
| UHP SPERICS RADIATED PROM THE BARTH AND ITS ENVIRONS   |  |
|  |  |
| RECEIVER HAS A MAXIMUM NOISE OF 3 DB; ANTENNA GAIN IS 6 DB   |  |
|  |  |
| SIGNAL TO NOISE RATIO OF 17.5 TO 27.5 DB   |  |

| 13 800. TO 5800. A 7.5 PERCENT 1.0 SEC 13 8. CEPTER PROPERTY 1.0 SEC 13. CEPTER PROPERTY 1.0 SEC 13. CEPTER PROPERTY 1.0 SEC 10.5 NM DIAM CIRCLE PROM 200 NM ALTITUDE | 00 NM ALTITIDE    ** ALTITUDE   ** INCLINATION   LOW CIRCULAR   MEDIUM   P.     EXPERIMENT     EXPERIMENT         NISM. CALIBRATORS, ELECTRONIC  | GT 144 Tel 13 131 131  | 1) APPLICATION A AND B PHASE B INTEGRATION STUDY DOCUMENT. NASA/ MSC, APRIL 1967.***2) HINZNER, R.A. ED: INTERIM REPORT ON SATEL- LITE MITEOROLOGICAL INSTRUMENTS. NASA/ERC PM-6713, JUNE 1967.*** 3) SEKERA, Z. AND HARHARN, T.: PROPOSAL POR VISIELE RADIATION POLARIZATION MEASUREKENTS FROM UNMANNED SPACECRAFT, UCLA, JAN. 1968 1958 1958 1958 1958 1958 1958 1958 195  |
|---|--|--|--|
| IN STRUMENT RESUME NATIONAL AERTHAUTINGS SPACE AMENINSTRATION ELECTRONICE RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | LEGENT:  LECONT: LECONTT: L | The countries   13 CONTRACT RUDGES   14 ELLES   16 CONTRACT RUDGES   16 CONTRACT RUDGES   17 CONTRACT RUDGES   17 CONTRACT RUDGES   18 CONTRACT RUDGES   1 | NAME OF STATE OF THE WISTELE UN ANGLES.  E 3 OF THE WISTELE AND FLUX ENTRED BEANS WITE SPIACED IN FLUX ENTRED STATE OF THE WILL BE COMPLES.  AND A SCAN BE THE WILL BE COMPLES BY BOTH OF THE SCOMPLES BY BOTH OF THE INSTRUME AND A SCAN BE THE INSTRUME AND A SCAN BE THE INSTRUME AND A SCAN BE ENTH'S OBLION OF 100 SCANS AT LIGHT FROM THE SKATTERADIS OF 100 SCANS AT LIGHT |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | 77 TO 3.0 CM 0.33 PERCEI   |
|--|--|
| CAMBRIDGE, MASSACHUSE I IS   | . BY   |
| CONT. 4-VAPOR-BESONANCE NICROWAYE RADIOMETER HVERR   | 14.0 DEG 50 NH (WITH SMEAR) FROM 200 NM ALTITUDE   |
| 11/10/69 0003  | DES 0,5 DEG/SEC LOW CIRCULAR MEDIUM  |
| . NASS INSTITUTE OF TECH   |  |
| S. CO.INVESTIGATOH IN CHOMINION TO EXCEPTIONE BARATH P. T. A. JET PROPERTOR IN THE STAFF TO SOME HOLD IN THE SOME HOLD IN THE STAFF TO SOME HOLD IN THE STAFF TO SOME HOLD IN  | 5. DICKE-TYPE RADIOMETERS, 4 ANTENNAS, ELECTRONICS   |
| NA INACT<br>NA INACT<br>20.45M CH-1CE 21. TELEPHO  | 4 WATES  |
| IGER, R.G. NASA HDOTRS OSSA/SRB  |  |
| 28 INSTRUMENT TYPE   | DELAYED TELEMETRY  |
| RADIOMETER, 5-CHANNEL MECHANICALLY-SCANNING DICKE MICROWAVE UNC. 28. APPLICATION   | 5 SCIENCE OUTPUTS, EACH SAMPLED TWICE PER SECOND WITH 10 BIT ACCURACY. 10 ENCINERATE OUTPUTS FACH SAMPLED ONCE FUEBY 10  |
|  | SECONDS WITH RELEASED TOTAL IS 109 BITS/SEC.   |
| TO HEASURE AND MAP THE THERMA  | GHT-TO-MED CLOUI   |
| VARUE RESUBANCE, AND THERE I UDIAIN INFORMATION CONCENTING THE VARIATION OF THE ATMOSPHERIC WATER VAPOR ABUNDANCE AND DISTRIBUTION WITH ALTITUDE, LIQUID WATER CONTENT OF THE ATMOSPHERE, CHARACTER DAYCHARDS AND SEA CHARA  | 1) NASA APPLICATIONS A AND B PHASE INTECRATION STUDY DOCUMENT. NASA/ASC, APRIL 1967.***2) MINZNER, R.A.ED.: INTERIM REPORT ON  |
| SURFACE DATORITHES FUREARRUNES AND SEA STATE.  |  |
|  | Manual Company of the |
| ANIZHMAS (2 OF THE CHANNELS SHARE AN ANTENNA). THE CHANNEL FRACOUNCIES ARE 10, 19, 22.2, 32 AND 52.8 GHZ. THE ANTENNAS 11, CM CHATH REPARENTED OF ADDODYTMANDET 5 DRG THE ANTENNAS   | OBIGINALLY SOUME PART OF INTEGRATED PASSIVE MICROMAVE EXPT.  |
| S. CAN THE EARTH SUBFACE NORMED TO THE S/C GROUN ITACK OUT TO SOME ON THE TANK OUT TO SOME |  |
| SITHER 50 DEG AHEAD OR   |  |
| OF 1 SEC FOR EACH INSTANTANTED FOR THIS FOR IS 50 BY 100 KM; HOWBURR, THE S/C HOTION DURING THE INTEGRATION TIME SMEARS THIS   |  |
| TO 100 BY 100 KM. THE RADIATION INTENSITY IS INFERRED FROM THE HEASURED ANTENNA TEMPERATURES USING ONE MINUTE CALIBRATION  |  |
| SEQUENCES EVERY 10 MIN AND BY ROLLING THE S/C TO LOOK AT COLD SPACE: POR A MINIMUM OF 10 MIN EVERY 6 HR. THE DESIRED ATMOS-  |  |
| PHERIC AND SURFACE PARAMETERS ARE OBTAINED FROM THE 5 INTENSITY MEASUREMENTS BY STATISTICAL PARAMETER-ESTIMATION TECHNIQUES.   |  |
|  |  |
| 32. PHENOMENA OBSERVED MITTED FROM THE BARTH'S SURFACE/ATHOSPHERE  |  |
| 33. MEASUREMENT RANGE BRIGHTNESS TERPERATURE PROM ZERO TO 400 DEGREES KELVIN   |  |
| SENSITIVITY IS ABOUT 0,3 TO 1,5 DEG K FOR 1 SEC INTEGRATION TIME   |  |
|  |  |

NIMBUS D (PROPOSALS ONLY)

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS              | 18 SPECTIAL RANGE 36 SPECTRAL RELOGICION S. THE CHARTER TO TAKE CHARTER TO TAKE CHARTER TO TAKE CHARTER TO TAKE CHARTER TO THE CHARTER THE CHARTER THROUGHT TO THE CHARTER THROUGHT THE CHARTER THROUGHT  |
|---|--|
| 1. TITLE 2. ACRONYM 3. EXPNO  | ULAS RESOLUTIO, 4. SPATTAL BESOLUTION  |
| CLOUD-TOP ALTITUDE RADIOMETER CAR (TITLE CONT.)   | 12. DEG 6.3 NM AT THE CENTER PROM 600 NM ALTITUDE  |
| 11/10/69  | MED CIRCULAR SUN-S   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE  |  |
| WARK, DR. D.O. NAT ENV SAT CTR BSSA 301-440-7114  | 3. AAIAN SANARAN SANAR |
| TINTURBATTY OF MARVIAND   | COMPONENTS  STRONGONICS  |
| TYPE 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STAFF   | AVERAGE POWER 61 STANGEY POWER   |
| IN NA INACT PROPOSAL IN AGENCY   20 PGM OFFICE   21, TELEPHONE  | 23 LB 7 t CU PT 7 WALLS.   |
| B. B. NASA HDOTRS OSSA/SRN 202-962-   | SENSITIVE  |
| ENDOR 23 LOCATION   | YESOVER RECOVER YES  |
| 28. INSTRUMENT TYPE   | SES TIEM 3 CONEX DELAYED INDEMETRY DAYLIGHT ONLY OR SELECTION OF SELECTION OF SELECTION ON THE SELECTION OF SELECTION ON THE SELECTION OF SELECTION  |
| SPECTROMETER, SINGLE GRATING LITTROW TYPE   | CHANNELS SAMPLED WITH 10 BIT RESOLUTION 80 TIMES IN  |
| 2   | IN REDUCTION OF  |
| nPose.  | os. a DVANTAGES AND E MITATLONS  |
| PRIMARY-TO DETERMINE CLOUD TOP ALTITUDE TO AN ACCURACY OF A PEW HUNDRED METERS. *** SECONDARY-TO ESTIMATE THE THICKNESS OF CLOUDS | INVERSION TECHNIQUES NOT NEEDED; CORRECTION FOR ABSORPTION IN CLOUD NEEDED, COVERAGE GAP FOR ADJACENT ORBITS 1000NM AT EQUATOR   |
|   | St. ARRUPENCES   |
|   | 1) SAIEDY, P. ET.AL.: CLOUD TOP ALTITUDE MEASUREMENT FROM SATEL-<br>LITES. APPLIED OPTICS, VOL. 4 1965.***2) MINZNER,R.A.:INTERIM  |
| 31. PRINCIPLES OF OPERATION   | REPT ON SATELLITE MET INSTRUMENTS.NASA/ERC PS-6713, JUN 1957.***   |
| THE INSTRUMENT PROPOSED FOR THIS EXPERIMENT IS A SINGLE GRATING   | JEN-A-BAND, APPLIED OPTICS, VOL 4, 1965.***4) PROPOSA  |
| LITTROG SPECTROMETER WHICH MEASURES, SIMULTANEOUSLY, RADIANCES  | A CLOUD-TOP ALTITUDE RADIOMETER FOR NIMBUS D. ESSA, JAN. 1966.   |
| IN 3 NABEROW, SPECIENT REGLONS: 2 NEGLONS ARE IN INC. CALGEN .A   | THIS INSTANTANT DID NOT RECEIVE FINAL ADDROVAL FOR PLICET  |
| REGION, CENTERED AT 7578 A, SERVES AS A REPERENCE SIGNAL. THE 2   | 00 DIAGNAM   |
| REGIONS IN THE BAND, ONE CENTERED AT 7606 A, THE OTHER CENTERED AT 7631 A CTUP CIOID-TOD HETCH INFORMATION FOR HICH ATTITUDE      |  |
| CLOUDS AND LOW TO MEDIUM ALTITUDE CLOUDS RESPECTIVELY. BY RE-   |  |
|   |  |
| DUE TO MOLECULAR OXYGEN IN THE AIR POR THE LIGHT REFLECTED FROM .   |  |
| ON PATH LENGTH AND ANGLE OF VIEW THE CLOUD-TOP HEIGHT IS DE-  |  |
| DUCED. THE CENTER OF EACH WAVELENGTH REGION IS SET TO WITHIN  |  |
| HAIR-MAYTHIN HEANSHIPSTON IS 8.0 A TO SITHIN 0.5 A. THE INSTRICT  |  |
| MENT SCANS SPATIALLY ACROSS THE SUBSATELLITE TRACK OUT 22.5 DEG   |  |
| E STEPS. THE RADIANCE   |  |
| IN EACH OF THE THREE MAYELENGTH REGIONS IS DIGITALD AS A 10 BIT. NUMBER STORED IN THE S/C RECORDER. CALIBRATION IS PERFORMED      |  |
|   |  |
| RELATIVE INTENSITY OF REPLECTED SOLAR RADIATION FROM CLOUDS.  |  |
| INTENSITY RANGES 2,4 TO 240 ERG/SEC/SQ-CM/STERADIAN/MICRON  |  |
| 34. PRECISION AND ACCURACY  |  |
| CLOUD HEIGHT WITHIN 200 M; ABSOLUTE ALBEDO: 3% AT FULL SCALE  |  |

NIMBUS E (PROPOSALS ONLY)

1) LAWSON, J. AND NEWELL, R.: PROPOSAL FOR A MIT AERONOMY EXPER-IMENT, E-2220, FEB 68.\*\*\*2) LAWSON, J.: DATA ACQUISITION AND REDUCTION MIT X-15 HORIZON DEFINITION EXPERIMENT PHASE 2, MIT 61 FREQUENCY OF OBSERVATION D.1 SECOND ENTIRE S/C POR WHENEVER POSSIBLE 50. AVERAGE POWER B1. STANDBY POWCH 52. PEAK POWER 53. MTBF 36. SPECTRAL RESOLUTION 137 TIME CONSTANT PROM 250 KM ALTITUDE 145. INCLINATION WILL REQUIRE ON-BOARD COMPUTER TO PROGRAM EXPERIMENT PITCHES THEREFACE TO INTERFERENCE SO INTERFERENCE ST. INTERFERENCE SO. SHIELDING HIGH VERY ACCURATE ATTITUDE CONTROL REQUIRED, PITCHE VERTICAL SCAN MODE, RROUIRES ON-BOARD CORPUTER. DELAYED TELEMETRY X DEG | 1 KM FROM 250 KM ALTITUDE 60. DATA RECOVERY DEG 1 KM BY 111 MICRONS LOW INSTRUMENTATION LAB, DEC 66. 15.0 PRIOR TO MEASUREMENT 62, TELEMETAY REQUIREMENTS 63. ADVANTAGES AND LIMITATIONS 9.0 0.02 DEG 48 WEIGHT - VOLUME 65, HISTORICAL REMARKS TO 0.04 BY CALIBRATION 64. REFERENCES 0.26 65 DIAGRAMS 0.04 42, PUIN 100 AC O ANGOLAR THE ATMOSPHERE IS TO BE SCANNED ACROSS THE LIMB OF THE EARTH WITH A PHOTOMETER HAVING A NARROW FIELD OF VIEW. THE SYSTEM CONSISTS OF A REPLECTIVE LENS TO COLLECT ENERGY AND POCUS IT ON A SLIT APERTURE, A SET OF IMAGE DISSECTING MIRRORS, AND BEHIND EACH MIEROR, A PILTER AND SENSON FOR THE ASSOCIATED MAYELENGTH. THE FILTER MIRRORS ARE SELECTED AND PLACED SUCH THAT EACH PASSES A DIFFERENT NARROW WAVELENOTH BAND TO A PHOTODIODE OR OTHER DETECT OF AND REPLECTS THE REMAINING WAVELENGTHS ONTO THE NEXT FILTER MIRROR. THE WAVELENGTHS TO BE MEASURED ARE 2600-4000 A,5770 A,AND 6 AND 15 MICRONS. USING SATELLITE ATTITUDE INFORMATION, HORIZON AND SUN SENSORS WILL BE USED TO DETERMINE THE ATTITUDE OF THE TERING ATMOSPHERIC COMPONENTS, SUCH AS AIR AND OZONE, DURING THE NIGHTSIDES OF THE ORBITS. THE SYSTEM TRACKS A STAR LOCATED NEAR THE ORBITAL PLANE AND MEASURES ITS INTENSITY AS IT MOVES INTO OR OUT OF THE ATMOSPHERE DUE TO VEHICLE ORBITAL MOTION. PHOTOMETRIC MASSACHUSETTS INST TECH 619-864-6900-X2940 PRO 2 ACRONYM 3. EXPINC 11/10/69 0006 PHOTOMETER RELATIVE TO THE HORIZON.SCANNING IN ALTITUDE IS ACCOMPLISHED BY PITCHING THE OPTICAL SYSTEM. A STAR OCCULTOMETER PRIMARY-TO MEASURE THE VERTICAL DISTRIBUTION OF DENSITY, TEMP-ERATURE, AND CERTAIN TRACE CONSTITUENTS, ON A GLOBAL SCALE \*\*\* SECONDARY-TO TEST A TANGENTIAL-VIEWING SATELLITE EXPERIMENT FOR WILL ALSO BE USED TO PROVIDE INFORMATION ON ABSORBING AND SCAT-INSTRUMENTS PRODUCE A SIGNAL WHICH IS PROPORTIONAL TO THE INCI-25. LEAD THASE 172 A PERON E09 INACT PROPOSAL MAXIMUM NOISE ESTIMATED TO BE 2 PERCENT OF MAXIMUM INTENSITY SOLAR AND STELLAR UV ENERGY PASSING THROUGH THE ATMOSPHERE 619-864-6900 0SSA/SRN 202-962-0891 20.PGM OFFICE 21. TELEPHONE DETERMINING ATMOSPHERIC PROCESSES ABOVE 25 KILOMETERS. 8. TELEPHONI ž PS. SPACECRAFT NIMBUS E NATIONAL ALMOATUTICA ALU STACLIADIMISTRATION ELECTRORIOS RESEARCH CERTER CAMBRIDGE, MASSACHUSETTS INTENSITIES OF 0.1 PICONAITS TO 0.1 MILLIWATTS 34. PRECISION AND ACCURACY MASSACHUSETTS INST TECH Χ PASTAL MATTER ASSUME 14. FLASH INDEX NUMBER SPECTROMETER, LIMB-SCANNING PHOTOMETRIC NASA HDOTRS ....... 10. ORGANIZATION 1. CREANIZATION DENT RADIATION INTENSITY. NEWELL DR. R. IN CONTRACT NUMBER A ERONOMY EXPERIMENT PRINCIPLES OF CPERATION 6. PRINCIPAL INVESTIGATOR PHENOMENA OBSERVED 33. MEASUREMENT RANGE æ MET, ATH-PHYS CO.INVESTIGATOR æ Z LAWSON, J. 28, APPLICATION 26. INSTAUMENT CHARDT MONITOR 22. VENDO

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBHIDGE, MASSACHUSETTS                 | 3b. SPECTRAL RANGE         A         0.23         PERCENT           2800.         TO 5000.         A         0.23         PERCENT           3b. FIELTOF VIEW         30.000 NM BY 10 NM PROM 600 NM ALTITUDE   |
|--|--|
| 12 ACRONYM B. INTION SURVEY EXPERIMENT APSURY E.   | NA RESOLUTION  O DEG 10 NA PROB 600 NA ALTITUDE  |
|  | A. ALTITODE TO INCIDENCE AND SUN-SYNCH RETROGRADE  |
| DR. P.P. IBM FEDERAL SYSTEMS DIV.  | SPECIAL SON ANGLE LIMITATIONS MAY BE NECESSARY   |
| BARRINGER, DR. A.R. BARRINGER RESEARCH LTD 416-677-2491  | 2 CORRELATION SPECTROMETERS, FOREOFICS, SCANNING MIRROR SYSTEM   |
| 8  | 30 LB 13. ACKNOWN 1 THENNAL IS CHIEF TO THENNAL IS CHIEF TO THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THENNAL IS CHIEF TO THE THEN THE THENNAL IS CHIEF TO THE THENNAL I |
| I. AGENCY IN A SA HOUTRS O   | g  |
| SEARCH REXDALE, TO   | DELAYED TRLEMETRY  |
| SPECTROMETER, ULTRAVIOLET CROSS-CORRELATING GRATING OR PRISH   PRO-  | 7 BITS PER SECOND COMPRISING 11 DATA CHANNELS, 12 HOUSEKEEPING CHANNELS, AND 6 DIGITAL MONITOR CHANNELS.   |
|  | SNOTATIONS   |
| PAIMARY-TO DEVELOP THE CAPABILITY OF OBTAINING GLOBAL ATHOSPHER-   | METHOD OF PRODUCTING SPECTRUM MASK PRODUCES A REPLICA WHICH CON-   |
| IC POLLUTION DATA.***SECONDARY-TO DETERMINE THE DEGREE TO WHICH : NATURAL BY RADIATION REPLECTED PROM EARTH CAN BE DETECTED AT       | TALNS ALL ABERRATIONS OF THE SPECTROMETER, USONE HAI BE KNOBLED.   |
| SATELLITE ALTITUDES.TO IDENTIFY SULFUR DIOXIDE AND NITROUS DIOX-   | 1) GORSCHBOTH, F. AND BARRINGER, A.: PROPOSAL FOR AN AIR POLLU-<br>TION EXPERIMENT, IBM CORP, FEB 68.***2) BARRINGER, A.: AIRBORNE   |
| I SAS OF POLLUTANTS.   | MEASUREMENTS OF ATMOSPHERIC SULPHUR DIOXIDE OVER WASHINGTON, DC, 1967  |
| THE AIR POLLUTION SURVEY SYSTEM WILL BE USED TO INVESTIGATE THE  |  |
| TWO CORRELATING SPECTRONZIERS, EACH INVESTIGATING A SINGLE ATMO-   | 65. HISTORICAL REMARKS   |
| SPHERIC POLLUTANT - INDUSTRIAL DISCHARGE(SO2) AND AUTOMOBILE SX-<br>HAUST(NO2) - WILL BE USED. THE DESIGN IS BASED ON THE BARRINGER/ | 3 UnitR v S  |
| G SULPHUR DIOXIDE MO<br>TANTANGOUS FIRED OF  |  |
| 2.75   |  |
| TORED  |  |
|  |  |
| ALONG THE VIEWING PATH, THIS TECHNIQUE OF CORRELATION SPEC-<br>TROMETRY MEASURES THE INTEGRAL OF POLLUTION DENSITY OVER THE RM-      |  |
| THRE DISTANCE THAT LIGHT TRAVELS FROM THE SUN TO THE GROUND AND HACK TO THE SAPELLITE, FOR THIS REASON SATELLITE HEASUREMENTS        |  |
| ) BE SUPERIOR TO GROUND MEASUREMENTS FOR DETE SPHERIC POLLUTANT BURDEN OR TOTAL POLLUTANT T  |  |
| 1  |  |
| LECTED PROM THE BARTH'   |  |
| 20 TO 2000 PPH/METER FOR BOTH SOZ AND NOZ  |  |
| +-50 PERCENT AT 20 PPM/METER; +-10 PERCENT AT 2000 PPM/METER   |  |
|  |  |

| INSTRUMENT RESUME   | 3. O. 1  |
|---|--|
| IISTRATION  | TO 1.2 MICRONS NA  |
| 1, TITLE  | J. 52. 7 A. 5. 50. U.  |
| XPERIMENT ALBEDO. E.  | N.   |
| (TITLE CONT.)  4. NEWML STATES.  1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1   | 200 M.T.A  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE  |  |
| PROWN, I. RCA ASTRO-ELECTRONICS   |  |
|   | SOLAR CELLS, AMPLIFIER   |
| TYPE 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STAHL   | 18 TO GAT SO VOL. V. B. AVERAGE PONGR STRATE AND ALL ASTERNA SOLITONES.  |
| 18. MONITOR 19. AGENCY 20 PGM OFFICE 21. TELEPHONE  | TO THE PARTY OF TH |
| SCHARDI, B. B.   NASA HDOTRS   OSSA/SRN   202-962-0891  | VENERAL AND AND AND AND AND AND AND AND AND AND  |
| TRO-ELECTRONICS PRINCETON, N.J.   | LF-CALIBRATION DELAYED TELEMET   |
|   | VYS.   |
| RADIOBETER, TWO SILICON SOLAR-CELL 129 SPACECRAFT 178 SPACECRAFT  | DATA WILL CONSIST OF SENSING UNIT CURRENT AND THERMISTOR TEMPER-   |
| ATM-PHYS.   |  |
| 30. PURPOSE   |  |
| PRIMARY-TO DETERMINE THE AMOUNT OF ALBEDO MEASURED IN TERMS OF SOLAR CELL CHRRENT OVER DIPPERENT DEGREES OF LATITUDE. TO CON- | THE NIMBUS SPACECRAFT IS IDEAL FOR AN ALBEDO EXPERIMENT RECAUSE IT MAINTAINS ONE AXIS COINCIDENT WITH LOCAL VERTICAL.  |
| STRUCT A MODEL OF THE EARTH'S ALBEDO. *** SECONDARY-WITH AN ACCU-   |  |
| RATE HAP OF THE EARTH ALBEDO, KNOWLEDGE OF THE ADDITIONAL POWER   | 1) 'PROPOSAL FOR NIMBUS R ALBEDO MEASUREMENT EXPERIMENT, TECH-   |
| OBTAINABLE PROM ALBEDO COULD BE USED TO ENHANCE THE PERFORMANCE OF UNDIONS CONTROL OF THE PERFORMANCE                         | MICAL SECTION, RCA ASTRO-ELECTRORIC DIVISION, FEB 68.  |
|   |  |
|   |  |
| SENSING THERMISTOR WILL BE LOCATED DIRECTLY UNDER THE SOLAR   | SE HISTORICAL REWAEKS  |
| THERMISTON PESTSTENCE AND. IN THEM. A CHANGE IN THE CIRCLE  | The state of the s |
| PLOWING THROUGH THE OUTPUT RESISTOR. THE CURRENT OUTPUT FROM THE  | 6b. DIAGRAMS   |
| ALBEDO SENSING UNITS WILL BE PED THROUGH A RESISTOR SUCH THAT   |  |
| PATED INTENSITY OF THE EASTH ALBEDO. THE INTENSITY IS ASSUMED   |  |
| TO BE 50 PERCENT OF THAT OBTAINED BY INTEGRATING JOHNSON'S SPEC-  |  |
| TRUE, OR APPROXIMATELY OF BILLIMATIS/SQUARE CENTIFIER, BASED ON A 196-MA DISPERS TREES AT 200 MILLIMOTES OF BARE (INVIT)      |  |
| TERED) SOLAR CELL EXPOSED TO THE DIRECT SUNLIGHT (139.6 MW/   |  |
|   |  |
| CALCULATED BY NUMERICAL INTEGRATION TO BE SO THE A DC AMPLIFIER UTIL DOONTDE TIMERS AMBITETCADION OF THE CONCOS STONES OF THE |  |
| -6.4 VOLT RANGE REQUIRED BY THE TELEMETRY SYSTEM.   |  |
|   |  |
| -   |  |
| 33 PHENOMENA DISSERVED  |  |
| REFIRECTED SOLAR ENERGY   |  |
|   |  |
| ZERO TO 70 MILLIWATTS PER SOUARE CENTIMETER  34. PRECISION AND ACCURACY   |  |
|   |  |
|   |  |

| INSTRUMENT, RESUME   | RANGE   |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONIUS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS                               | 10.53 TO 0.9 BICHONS: NA 10.50 FIELD OF VIEW 180 GROUND SWATH 0.28 RV 0.28 DPG NA   |
| 1, TITLE   | TION 41.  |
| ATMOSPHERIC DENSITY BY STELLAR REFRACTION SRDM (TITLE CONT.)   | 5 VERSON AS POLITING ACCUMANY 142 POLINTING SAME 44, ALTITUDE 49, IAND MAIL CA  |
| 11/10/69 0006  | ANY   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 46, SPECIAL REQUIREMENTS  |
| P. SCHBACH, P. P. 10. OP MICHIGAN 313-764-6565   | SATELLITE POSITION TO RITHIN ACCURACY OF THE TRACKING NETWORK   |
| BARTHAN P. 313-764-7210  | 2 TELESCOPES/GYROSCOPES, IMAGE DISSECTOR PHOTOTUBE  |
| NA NA  | 44 LB. 3.74 CU PT. 18 WATTS. 5 WATTS. 35 WATTS.   |
| 19. AGENCY   | 54 INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFEREN  |
| SCHARDT, B. INASA HDOTRS I USSA/SKN LOZ-95Z-US93.  22. VENDOR   22. VENDOR   24. LOCATION   24. LEAD TIME                        | 15s. CALIBRATION (60. DATA RECOVERY IF ABOUT NOT OBSERVATION  |
| O OF MICHIGAN ANN ARBOR, MICHIGAN NA 31  | 31 MONTHS NONE NONE DELAYED TELEMETRY DUBLING NIGHTIME OF TELEMETRY DUBLING NIGHTIME  |
| STAR TRACKER, DOUBLE TELESCOPE IMAGE-DISSECTING PHOTOTUBE  | ं ।   |
|  | ne rest second on 330 nes   |
| JO PURPOSE   | 63. ADVANTAGES AND LIMITATIONS CONMITMENT CONTINUES MORPHONES ITMENDS OF MICHIGAN   |
| PRESENTE AND TEMPERATURE FOR COMPANIES OF ATMOSPHERIC DENSITY, PRESENTE AND TEMPERATURE FOR COMPANIES OF ATMOSPHERIC DENSITY,    | SITY, CONTINUOUS WORLDWIDE MEASUREMENTS, LIGITED TO NICHTIME OF THE CONTINUOUS WORLDWIDE CLOUDS   |
| CURRENIN AND SEASONESSENIN CVER SPARSE DATA AREAS *** DECONDANT - TO   | 0.1.1   |
| GROUND RADIANCE NEAR THE HORIZON, AND STARLIGHT ATMOSPHERIC  | MEASUREMENTS  |
| ATTENUATION.  31. PRINCIPLES OF OPERATION  | BULLETIN AMER MET SOCIETY, VOL 46 NO 9, SEPT 1965.  |
| THE EXPERIMENT PROPOSES TO MEASURE THE REPRACTION OF STARLIGHT   |   |
| VERTICAL DENSITY PROFILE THE AMOUNT THAT LIGHT IS REFRACTED IS   | YE A 'ES. HISTOFICAL REMARKS  |
| PROPORTIONAL TO THE DENSITY OF THE ATMOSPHERE, FROM THE DENSITY  | ٠   |
| THE PRESSURE AND TERPERATURE CAN BE INFERRED. THE INSTRUMENT PRO-  | PRO-  |
| SCOPE ASSEMBLY (SECTIONS A AND B) AND AN INAGE-DISSECTING PHOTO-   | -0100   |
| TUBE. THE GIMBALLED TELESCOPE ASSEMBLY VIEWS THE HORIZON IN THE OPERATAL DIAMP, HOON COMMAND THE TRACKER SCANS ACROSS 60 DECREES | 23 to 20 to |
| IN AZIMUTH AND 8 DEGREES IN ELEVATION SEEKING A STAR EXCREDING   | SNI S   |
| A PRE-SET BRIGHTNESS.UPON FINDING SUCH A STAR, IT IS TRACKED BY A SECOND TELESCOPE WITH A PIELD OF VIEW OF 17 ARC-MIN BY 17 ARC- | D BY<br>ARC- :  |
| OCCULTATION BY THE EARTH. T  |   |
| PLACEMENT, WHICH IS A REASONE OF THE REFRACTIVITY, IS THEN HE CONDED. AFTER OCCULTATION THE PROCESS IS REPEATED. THE PERIOD OF   | a O   |
| NDS, DEPENDING ON  | SO NO   |
| MINGTES DEPENDING UPON ELEVATION OF INITIAL ACQUISITION.   | 44  |
| 32. PHENOMENA OBSERVED   |   |
| STARLIGHT PASSING THRU ATROSPHERE  |   |
| DENSITY PROFILES BETWEEN EXTANT CLOUD TOPS AND 30 KM   |   |
|  |   |
| I TO 4 ARC-SEC RMS   |   |

| INSTRUMENT RESUME  | AAL AANGE 36. SPECTRAL!  |
|--|--|
| NATIONAL AEFIGNAUTICS AND SPACE ACMINISTRATION<br>ELECTRONICS RESEARCH CENTER  | 2600. TO 3800. A 0.208 PERCENT 34 11ELD OF VIEW  |
| CAMBRIDGE, MASSACHUSETTS   | 0.03 DEGINA  |
| 1. TITLE 2. ACRONVM 3. EXPNO 1. TITLE 1 | 143 ANGULAR HISOLUTIONAN, SPATIAL RESOLUTION   |
| A LESUME   | 42 POINTING ACCUMANCY 43. POINTING HATE 44. ALTITUDE 45. INCLINATION   |
|  | MED SUN-SYNCH RETROGRADE   |
| GATOR 7. ORGANIZATION  |  |
| PALMER, C.E. UNIV CALIFORNIA AT L. A. 213-272-8911   | TIME AND DURATION OF OCCULTATION MUST BE PRECISELY KNOWN   |
| FIRCHRO-COUTCAL SVATERA  | ACTIONATIVE GARACTERS.   |
| MBER 15. DATE  | 43. WEIGHT 48. VOLUME 50. AVERAGE POWER 51. STANDBY POWER 52. PEAK POWER 53 MTBF   |
| NA   | 16 L.B7 CU PT. 4 WATTS 12 WATTS  |
| 19. AGENCY Zo, PGM OFFICE  | 54 INTERFERENCE 153. INTERFERENCE 156. INTERFERENCE 57. INTERFERENCE 58. SHIELDING   |
| 22. VENDOR DATE DATE TO LOSSAND TO STAND THE TO SELECT TO STAND THE TO SELECT THE TO S | 59. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION   |
| -OPTICAL SYSTEMS PASADENA, CALIFORNIA  | DELAYED TELEMETRY  |
| 000000000000000000000000000000000000000  | 02. TELEMETRY REQUIREMENTS   |
| 28. APPLICATION  | PRODUCES OUTPUT DURING A 36 SECOND INTERVAL, TWICE PER ORBIT. REQUIREMENT IS FOUR 10-RIT DIGITAL WORDS SAMPLED AT 1 SECOND   |
| MET, ATH-PHYS  | OF 40 BITS/SECOND DURING 36 SECOND   |
|  |  |
| PRIMARY-TO MEASURE ATMOSPHERIC OZONE BY MONITORING THE ATTENU-   | OCCULTATION TECHNIQUE HAS UNIQUE ADVANTAGES IN TRACING HIGH  |
|  | id. REFERENCES   |
| ANALYSIS OF THE BUILDUP AND COLLAPSE OF THE POLAR STRATOSPHERIC  | 1) PALMER, C., ET AL: PROPOSAL FOR INVESTIGATION OF OZONE  |
| VORTEX***SECONDARY-TO ACQUIRE DATA FOR ONE YEAR OVER BOTH POLAR  | NEWENTS IN THE TERRESTRIAL ATMOSPHERE, UCLA, JAN (   |
| CARS TO BE THE BASE OF A NEW UZUNE CLIMATULUGI IN HIGH LALITUDES   | ***2) FITTOCK, A., J.G.K., V. 65, P. 5143 (1963).***3) LIBBY, W.P., J.G.R., V. 65, P. 3307, (1960).  |
| THE SPECTROMETER WILL MONITOR THE ATTENUATED SOLAR RADIATION IN  |  |
| THE MIDDLE UV AS THE SUN IS OCCULTED BY THE EARTH AND ITS ATMO-  |  |
| SPHERE, TEN DIFFERENT WAVELENGTHS (EACH OF 2.5 A BANDWIDTH) WILL   | 65. HISTORICAL REMARKS   |
| BE ISOLATED BY THE SPECTROMETRR, 2600,2750,2850, 2950,3050,3150,   | 66. DIAGRAMS   |
| MONTHORRO DIRETER ONE OCCULTANTION ONLY 3 MAYELENGTHS WELL IN DE   |  |
|  |  |
| ONE ANOTHER, AS EACH WAVELENGTH GIVES INFORMATION IN ONLY ONE  |  |
| ALTITODE RANGE. IN ADDITION, THE MONITORING OF 3800A WILL DETECT BOSSIBLE ATTENDATION DIE TO APPOSOL AND DIET 13799S OVER THE  |  |
| ENTIRE ALTITUDE RANGE FROM 50 TO 70 KM.A MEASUREMENT OF SOLAR  |  |
| INTENSITY MUST BE MADE AT A GIVEN WAVELENGTH WHEN THE SATELLITE  |  |
| IS IN AN UNOCCULTED POSITION TO CALLBRATE THE TOTAL INSTRUMENT   |  |
| SIMILAR MEASUREMENT AT ANY POINT IN THE CLUEN MAVELENGTO. A  |  |
| ORBIT THEN PROVIDES A TRANSMISSION MEASUREMENT FOR THE CORRE-  |  |
| PATH. THE SATELLITE, DUE TO IT   |  |
| TION, ACTUALLY VIEWS THE SUN THROUGH A CONTINUOUS NUMBER OF ATHOR SUBPRIS AN OBSICAL THACE SITCING RECHIOUS REDUCTING THE  |  |
| RIZONTAL LINE SOURCE, IS TO BE EMPLOYED.   |  |
| 32. PHENOMENA OBSERVED TITERATIONER SOLAR PRESEVATORISTED BY THE PARTH'S BITHOS DHERE  |  |
| 33. MEASUREMENT RANGE  |  |
| OZONE PROFILES PROM 20-70 KM, FROM 60 TO 85 DEG N AND S LATITUDE   |  |
| AT THE CASHON WITH HIN S KM . S / N=1000 ROW 2500 A WITH 1 INCH COLLECTION   |  |
| THAT TO COMPANY OF THE PROPERTY  The second secon |

| INSTRUMENT RESUME NATIONAL AEHONAUTICS AND SPACE ADMINISTRATION  | 36. SPECTRAL RESOLUTION 37. TIME CONSTANT 2555. TO 3800. A 0.0161 PERCENT   |
|--|---|
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS  | 38. FIELD OF VIEW 38. GROUND SWATH 12. DRG NA   |
| 2. ACRONYM   | PATIAL  |
| BACK SCATTERED ULTRAVIOLET RADIATION EXPERIMENT BUY R15 (TITLE CONT.)  | 12. POINTING ACCUMANCE 143. POINTING RATE 144. ALTITUDE 145. INCLINATION  |
| 11/10/69   | MED   |
| 7. ORGANIZATION  |   |
| HEATH, DR. D. F. GUDDARD SPACE FLT CENTER 301-982-6421 9. CO-INVESTIGATOR IN. ORGANIZATION   | MAINTAIN LOW TEMPERATURE DIFFERENTIAL ACROSS SENSOR MODULE 4) COMPONENTS  |
| H  | PECTROPHOTOMETER, PILTER PHOTOMETER, ELECTRONICS  |
| NUMBER 14. FLASH INDEX NUMBER 15. STAFF  | T 49. VOLUME 50. AVERAGE POWER 51. STANDEY POWER 52.  |
| 18. MONITOR (NA 12. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 53 LB ANAGARIA SA NAGARIA SA NAGARIA SA NAFEREGENCE 53, NAFEREGENCE 56. SHEEDING  |
| r, B. B. NASA HDOTRS O   |   |
| 22 VENDOR  | DER CALIBRATION 100 DATA RECOVERY 10.1 FREQUENCY OF OBSENVATION DER EVALITIES CONTINUOUS                                  |
| 20. INSTRUMENT TYPE  |   |
| SPECTROMETER, TWO EBERT-PASTIE PHOTOMETRIC   | FOUR 10 BIT WORDS WILL BE REQUIRED FOR EACH 2.5 SEC READOUT OF  |
| ZS. ATTECHATION  |   |
| POSE   | 33. ADVANTAGES AND LIMITATIONS  |
| PRIMARY-TO PROVIDE SYSTEMATIC GLOBAL SCALE OBSERVATIONS OF THE CDAMTAY DISCREPANCION OF APPROPRICATION OF APPROXIMATION OF AP | SATELLITE METHODS MOST PRACTICAL FOR OBTAINING CONTINUOUS HIGH  |
|  | 84. REFERENCES  |
| ATHOSPHERE.  |   |
|  | SPATIAL DISTRIBUTION OF ATMOSPHERIC OZONE FROM MEASUREMENTS OF UV RADIATION BACKSCATTERED BY THE RARTH'S ATMOSPHERE USING |
| 31. PRINCIPLES OF OPERATION  | AVE, J.V. AN  |
| THE PURPOSE OF THE EXPERIMENT IS ACCOMPLISHED BY INVERSION OF  | CTROMAG SENSING OF EARTH PROM SATELLITES,   |
| MEASUREMENTS OF SOLAR OV RADIATION BACKSCATTERED BY THE ATMO-  | PRESS. N.Y. NOV 65.   |
| IN THE SPECTRAL REGION 2555-33984. THE BACKSCATTERED RADIATION   |   |
| ON WHEN THE SATELLITY  | .66. DIAGRAMS   |
| ON THE DAYLIGHT SIDE OF THE BARTH. TO PROVIDE CALIBRATION, THE ALDRON COLD CALL A DIRECTOR   |   |
| PLATE TO REFLECT THE RADIATION INTO THE INSTRUMENTAS THE SAT-  |   |
| ELLITE ENTERS THE DARK ZONE, DETECTION OF THE RADIATION BACK-  |   |
|  |   |
| FOLL BOOM WILL BE USED TO DEDUCE NIGHT TIME OZONE, AN INDEPENT   |   |
| ACCOMPLISHED AS THE SATELLITE EXITS PROM THE DARK ZONE. THE  |   |
| DOUBLE (TANDEM) EBERT  |   |
| SPECISOPROIDER WITH A 12-DEGREE FIELD OF VIEW AND A SELECTION OF 10 ANGSTROMS, AND AN ANCILLARY NARROW-BAND INTERPER-  |   |
| ENCE FILTER PHOTOMETER. THE PHOTOMETER WILL BE ATTACHED TO THE   |   |
| THE REPLECTIVITY OF THE GROUND-ATM   |   |
| SYSTEM IN THE SPECTRAL REGION PRES OF OZONE ABSORPTION. THE INSTRUMENT WILL RECORD A 50 A BAND CENTERED AT 3800 A.   |   |
|  |   |
| BACKSCATTERED UV SOLAR RADIATION FROM ATMOSPHERE & LUNAR SURFACE.  |   |
| HEIGHTS GREATER THAN 30 KILOMETERS   |   |
| 34, PRECISION AND ACCURACY   |   |
| U. Z ANGSTRON  |   |
|  |   |

| SWILSE INSWIGATOR  | 38. SPECTRAL RANGE   |
|--|--|
|  | 3.00 GHZ NA  |
| CAMBRIDGE, MASSACHUSETTS   | 2.55 DEG 6   |
| 2. ACRONYM   |  |
| GLOBAL NADAR FOR OCEAN WAVES AND WINDS GREW FIG  | 4 1400 KM ALTITUDE AT 20   |
|  | 1.0 DEG STREET S |
| & PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE  |  |
| W.J. NEW YORK UNIVERSITY   |  |
| THITTED COLUMNICATION  | 4) COMPONENTS COMPONENTS OF THE PROPERTY OF TH |
| 12.CON/PACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STAFF 16.CON-11.00 11. STATUS   | 46. WEIGHT 'S VOLUME AN AVERAGE POWER IN LIANDS FOR SPEAK DOLLE S. MIRE  |
| NA   | 45 WATTS   |
| IS. AGENCY 20.PGM OFFICE 21  |  |
| L. B. B. NASA HDOTRS OSSA/SRN 202-962-   | SOURC/SEN  |
| ENDOR 23 LOCATION  | BHA: ION BUT DATA RECOVERY   |
| 26. INSTRUMENT TYPE 12. INSTRUMENT TYPE 12.  | NONE OVER OCEAN.   |
| R, TWIN 1.5-GHZ (20 CM) SIDE-LOOKING RADAR   | MINIMUM BIT RATE IS 336 KILOBITS PRE ORBIT, MAXIMUM DATA RATE IS   |
|  | ADD 30 KILOBIES P.   |
| MET, OCEAN   | ORBIT.   |
| JU PURPOSE   | TAGES AND LIMITATIONS  |
| PETRARY-TO OBTAIN SCATTERING-CROSS-SECTION DATA FOR (1) CHARTING   | GUARANTEE  |
| WAVE CHARACTERISTICS OVER THE WORLD OCEANS, (2) IMPROVING THE PROGRESS OF STREET OF ST | HEAVIEST CLOUDS AND RAIN CHOSEN TO PERMIT CONTINUOUS COVERAGE  |
| NACHELOGO CE JOINTACE HILV FILLDS CVERA COCEANO, AND CAS DEBUBLING DEATH HAVE AND MIND PIPELD PODDETACHCERACOCONDADY—FO  |  |
| EVALUATE THIS TYPE OF INSTRUMENT FOR OTHER APPLICATIONS.   | ⊃ FJ   |
|  |  |
| 31. PRINCIPLES OF OPERATION  | FROM SPACE, POLYTECHNIC PRESS, 1967.   |
| THIS SIDE LOOKING RADAR SCATTERONETER IS PROPOSED TO GATHER  |  |
| INFORMATION ABOUT INS MIND SPEED AT THE SOURFACE OF THE MORELL'S   | 65 HISTORICAL REMARKS  |
| CLEMBOR JUNEAU STATISTICS OF PRINCIPLES DI REFERONZINO TO TOTAL TOTAL TOTAL TO TOTAL TO TOTAL TO TOTAL TO TOTAL TO TOTAL TO TOTAL TOTAL TOTAL TOTAL TOTAL TO TOTAL TO TOTAL TO TOTAL TO TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL | TOTAL CONTROL OF THE  |
| SECTION OF A PAICH OF OCEAN. THE CROSS-SECTION IS GOVERNED, AT   | 66. DIACHAR LUSTRUMENT HAS BEEN PROPOSED FOR NIMBUS 7 (RADSCAT)  |
| FELD, HENCE THE OBSERVI  |  |
| VALUE CAN BE USED TO ESTABLISH THE WIND SPEED. HEASUREMENTS WILL   |  |
|  |  |
|  |  |
| USES TWO COLLAPSABLE 2.25 METER-LONG ANTENNAS. THE ANTENNAS  |  |
| E SATELLITE  |  |
| VARILING INCLURNCES THE SISTEM COLES A 20 MAIT FEAT PORTE SINAND COLORS OF A C |  |
| COUNTY OF THE POST TERMS OF THE PROPERTY OF THE PROPERTY OF THE POST OF THE PO |  |
| MAIN D DI GO THE LEAGHTED AT MILCH NO INDECONT LOS DANDS.  |  |
| םו במבעטב  |  |
|  |  |
|  |  |
|  |  |
| 32 PHENOMENA OBSERVED  |  |
| RETURNED RADAR ELECTROMAGNETIC ENERGY AT 3.00 GHZ  |  |
|  |  |
| WAVE HEIGHT PROM 1 TO 10 METERS; WIND SPEED FROM 6 TO 36 KNOTS   |  |
| 34. PRECISION AND ACCURACY   |  |
| WIND SPEED WITHIN I KNOT   |  |

|  | INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH EGNTE CAMBRIDGE MASSACHISETS  | AL RANGE TO 1  |
|--|--|--|
| 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,   | 2. ACRONYM   | 2.8 BY 2.8 DEG NA 40.ANGULAR RESOLUTION OF SPATIAL RESOLUTION  |
| 1.   | SPECTROMETER HRES EC   | 44. ALTITUDE   45.   |
| A. 38. GOODERS SEARCE PIT CENTER   101-392-6465   1712 OP DEFECRATION   10 CHORDER SEARCE   1712 OF DEFECRATION   10 CHORDER SEARCE   1712 OF DEFECRATION   10 CHORDER SEARCE   1712 OF DEFECRATION   1713 OF DEFECRATION   1714 OF DEFECRATION    | 7. ORGANIZATION B. TELEP   | 46. SPECIAL REQUIREMENTS   |
| 1   100      | GODDARD SPACE PLT CENTER   | VIEW OF DEEP SPACE   |
| TATE      | GODDARD SPACE PLT CENTER   | NTERFEROMETER, COOLER to Ancede Bourse is a second   |
| THOUSE SALES AND SEAL STREET OF THE TREATMENT OF THE TREA | NA NA NA   | FT 10 WATTS 3 WATTS  |
| NA LOCATION  NA LOCATION  NA LOCATION  NA LANGE TO THE PROPER THE PROPERTY REQUIREMENTS  LUTION 15-HICRON PABRY—PEROT ETALON! PRO CONTRINCE OF THE PROPERTY REQUIREMENTS  LUTION 15-HICRON PABRY—PEROT ETALON! PRO CONTRINCE OF THE STRONG THE STRONG THE STRANGE AND LINEAR STRONG THE STRANG THE STRONG THE STRONG THE STRANG THE STRENG THE STRENG THE STRANG THE STRANG THE STRANG THE STRENG THE STRENG THE STRENG THE STRENG THE STRENG THE STRANG THE STRENG THE STRENG THE STRENG THE STRENG THE STRENG THE STRENG THE STRANG THE STRENG THE STRENG THE STRENG THE STRANG THE STRENG THE STRANG THE STRENG | B. B. NASA HDOTRS OSSA/SRN   | INTERFERENCE 57 INTERFERE  |
| HAND STATEMENTS  HAND COMMENS  AND COMMENS  BY TELEBETTS  SAMPLES REFS  SECOND.  SAMPLES REFS  SAMPLES REFS  SAMPLES REFS  SAMPLES  SAMPLES REFS  SAMPLES  SAMPLES REFS  SAMPLES  INCRONS - EXTENDS  INCRONS -  | 23 LOCATION 24 FLIGHT  |  |
| HATTON 15-HICRON PARENETER TO THE STATEMENTS OF THE PROPERTY O | NA   |  |
| THE UNDER THE PROPERATURE STRUCTURE OF THE TRANSCHERE ***  TRANSCHERE TO THE STRATOSHERE ***  TRANSCHERE ***  TRANSCHERE TO THE STRATOSHERE ***  TRANSCHERE ***  TRANSCHERE THE THOSE OFTAINED FROM  THE UPPERATURE CORD ADDITION FOR A HIGH RESCLUTION FAR ALMOSHERE TO THE TRANSCHERE THE TRANSCH | HETER, HIGH-RESOLUTION 15-MICRON PABRI-PEROT ETALON  | SAMPLING RATE DURING OPERATION WILL BE 12 SAMPLES PER SECOND, HOUSEKEEPING 1 SAMPLE PER SECOND WITH 10 RIT TELEMETRY |
| TROUGHER TERPERATURE STRUCTURE OF THE  TROUGHERSE STRUCTURE OF THE  TRANSCREAMS TO THE STRATOSPHERE ***  TREASURARY TO THE STRATOSPHERE ***  TRANSCREAMS TO THE STRATOSPHERE ***  TRANSCREAMS TO THE STRATOSPHERE ***  THOURS, WAA, ET AL PROSONAL FOR A HIGH RESOLUTION FAR SCRUTTON FAR STRATUPE IN THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION FAR STRATOSPHERE THE RESOLUTION OF THE RESOLUTION OF THE RESOLUTION OF THE REPRESENCE WILL RESOLUTION OF THE REPRESENCE WILL RESOLUTION OF THE REPRESENCE WILL RESOLUTION OF THE REPRESENCE WILL RESOLUTION OF THE REPRESENCE WILL RESOLUTION FAR STRATOSPHERE.  THIS UPPER ATMOSPHERE THE REPRESENCE WILL RESOLUTION FAR STRATOSPHERE.  ERRENDICCIAR TO THE ORBITAL PLANF.  BERNOLCCIAR TO THE ORBITAL PLANF.  BERNOLCCIAR TO THE ORBITAL PLANF.  BERNOLCCIAR TO THE ORBITAL PLANF.  THOUGH AN ANGLE OF THE RESOLUTION FAR THE RESOLU | The state of the s | CORAGE WOULD BE NEEDED FOR 130 BITS PER  |
| TROPOSPHERE TO THE STRATOSHERE ***  E NEASUREMENTS WITH THOSE OBTAINED FROM OSPHERE.  L BE TILTED THROUGH AN ANGLE OF APPROX CTRUM OF THE ATMOSPHERE WILL BE PROURING TRANSFORM REQUIRED. THE INSTRUBE THE REPERFORM OF THE SIGNAL TO STHE TEMPERATURE AS A FUNCTION OF THE TEMPERATURE AS A FUNCTION OF WILL MONITOR TWO SPECTRUM INTERVALS:  THE TEMPERATURE AS A FUNCTION OF WILL MONITOR TWO SPECTRUM INTERVALS:  THE UPPER ATMOSPHERE, AND 14.0 TO 14.1  ERPENDICULAR TO THE ORBITAL PLANF.  BY THE ATMOSPHERE  BRY THE ATMOSPHERE  DEG K WITH SAN OF 100 AT 280 DEG K  | -TO DETERMINE THE VERTICAL TEMPERATURE STRUCTURE   | WCREASED SPECTRAL  |
| DING INSIGHT INTO THE INTERACTION OF OSPHERE.  L BE TILTED THROUGH AN ANGLE OF APPROX CTRUM OF THE ATMOSPHERE WILL BE PRO-URIER TRANSFORM REQUIRED. THE INSTRUBE WILL BE PROFERE WILL BE PROFERED TO THE SIGNAL TO STHE TEMPERATURE AS A FUNCTION OF THE SIGNAL TO STHE TEMPERATURE AS A FUNCTION OF THE UPPER ATMOSPHERE, AND 14.0 TO 14.1 OSPHERE.  ER AND ZERO LEVEL REFERENCE WILL REBRENDICULAR TO THE ORBITAL PLANF.  BY THE ATMOSPHERE  BRENDICULAR TO THE ORBITAL PLANF.   | PPER TROPOSPHERE<br>THESE MEASUREMENT  | NT UPWARD  |
| L BE TILTED THROUGH AN ANGLE OF APPROX CTRUM OF THE BATNOSPHERE WILL BE PRO- D ELEMENTS IN ONE SCAN, THE RECEIVED F THE TEMPERATURE, COMBINING THIS WITH TING WAYELENGTH OF THE SIGNAL TO S THE TEMPERATURE AS A FUNCTION OF R WILL MONITOR TWO SPECTRUM INTERVALS; THE UPPER ATMOSPHERE, AND 14.0 TO 14.1 OSPHERE. ERPENDICULAR TO THE ORBITAL PLANF.  BY THE ATMOSPHERE  BRY THE ATMOSPHERE  BRPENDICULAR TO THE ORBITAL PLANF.  |  | 1) HOVIS, W.A., ET AL: PROPOSAL FOR A HIGH RESOLUTION FARRY-   |
| L BE TILTED THROUGH AN ANGLE OF APPROX CTRUM OF THE ATMOSPHERE WILL BE PRO- URIER TRANSFORM REQUIRED. THE INSTRU- D ELEMENTS IN ONE SCAN, THE RECEIVED F THE TEMPERATURE. COMBINING THIS WITH ING WAYELENGTH OF THE SIGNAL TO S THE TEMPERATURE AS A FUNCTION OF R WILL MONITOR THO SPECTRUM INTERVALS: THE UPPER ATMOSPHERE, AND 14.0 TO 14.1 OSPHERE. ERRAND ZERO LEVEL REFERENCE WILL RE- ERRAND ZERO LEVEL REFERENCE WILL RE- ERRAND ZERO LEVEL REFERENCE WILL RE- BRAND ZERO LEVEL REFERENCE WILL RE- BRAND ZERO LEVEL REFERENCE BRY THE ATMOSPHERE  BY THE ATMOSPHERE  DEG K WITH S/N OF 100 AT 280 DEG K  | the tackouthere and other coefficies.  | NASA GODDARD SPACE FLIGHT CENTER, CODE 622.***2) HILLEARY,   |
| CRUIN OF THE ATMOSPHERE WILL BE PRO- URIER TRANSFORM REQUIRED. THE INSTRU- URIER THE OFFER THE SECTION OF THE OFFER THE OFFE |  | ET AL: NATURE, 209, 489 (1965) .***3) WARK AND FLEMING: MONTHLY  |
| URIER TRANSFORM REQUIRED. THE INSTRU-  DELEMENTS IN ONE SCAN, THE RECEIVED  F THE TEXPERATURE. COMBINING THIS WITH  TING WAY BLENGTH OF THE SIGNAL TO  S THE TEXPERATURE AS A PUNCTION OF  R WILL MONITOR TWO SPECTRUM INTERVALS:  STHE UPPER ATMOSPHERE, AND 14.0 TO 14.1  OSPHERE.  ERPENDICULAR TO THE ORBITAL PLANE.  BY THE ATMOSPHERE  BY THE ATMOSPHERE  DEG K WITH S/N OF 100 AT 280 DEG K   | ∺ ը։   | REVIEW, 94, 351 (1956).***4) WARK, ET AL:<br>REVIEW, 95, 468 (1967).   |
| D ELRENTS IN ONE SCAN, THE RECIFUED F THE TEAPERATURE. COMBINING THIS WITH THE WAVELENGTH OF THE SIGNAL TO S THE TEMPERATURE AS A FUNCTION OF R WILL MONITOR THO SPECTRUM INTERVALS: THE UPPER ATMOSPHERE, AND 14.0 TO 14.1 ENPENDICULAR TO THE ORBITAL PLANF.  BY THE ATMOSPHERE  DEG K WITH S/N OF 100 AT 280 DEG K  DEG K WITH S/N OF 100 AT 280 DEG K  | FOURIER TRANSFORM REQUIRED.  |  |
| TING WAVELENGTH OF THE SIGNAL TO STHE TEMPERATURE AS A PUNCTION OF R WILL MONITOR TWO SPECTRUM INTERVALS: THE UPPER ATMOSPHERE, AND 14.0 TO 14.1 OSPHERE.  ERPENDICULAR TO THE ORBITAL PLANE.  BY THE ATMOSPHERE  DEG K WITH S/N OF 100 AT 280 DEG K   | MENT WILL SCAN 60 RESOLVED PLEMENTS IN ONE SCAN, THE RECEIVED SIGNAL IS A REACHBREATH OF THE TRADEDATINE COMPLIANCE THE CITH   | 66. DIAGRAMS   |
| S THE TEMPERA R WILL MONITO OSPHERE. ER AND ZERO L ERPENDICULAR BY THE ATMOS DEG K WITH S  | A WEIGHTING PUNCTION RELATING WAYELENGTH OF THE SIGNAL TO  |  |
| THE UPPER ATH OSPHERE, ER AND ZERO LERPENDICULAR BY THE ATHOS DEG K WITH S   | ATMOSPHERIC PRESSURE GIVES THE TEMPERATURE AS A FUNCTION OF PRESSURE, THE SPECTROMPTER WILL MONITOR TWO SPECTRUM INTERVALS:  |  |
| DEG K WITH S/N OF 100 AT 28  |  |  |
| BRPENDICULAR TO THE OR BY THE ATMOSPHERE DEG K WITH S/N OF 100   | EVEL REFERENCE   |  |
| BY THE ATMOSPHERE DEG K WITH S/N OF 100  | TO THE ORBITAL   |  |
| BY THE ATMOSPHERE<br>DEG K WITH S/N OF 100   |  |  |
| BY THE ATMOSPHERE<br>DEG K WITH S/N OF 100   |  |  |
| BY THE ATMOSPHERE DEG K WITH S/N OF 100  |  |  |
| DEG K WITH S/N OF 100  | IGY EMITTED BY THE ATMOS   |  |
|  | DEG K WITH S/N OF 100  |  |
|  |  |  |

| INSTRUMENT RESUME  | 36. SPECTRAL BANGE 36. SPECTRAL RESOLUTION 37. TIME CONSTANT 7 6 TO 22 DESCRAL                     |
|--|--|
| NATIONAL ARKUNDIUS AND YAKLE AUMINISI HATION ELETRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | VIEW 39. GROUND SWATH DEG 44 KM DIAM CIRCLE F  |
|  | 49.ANGULAR HESOLUTION 11. SPATIAL RESOLUTION   |
| INPRARED INTERPEROMETER/SPECTRONETER A PECCHE SOLVER STATES  | 2.3 DEG 44 KM FROM 1100 KM ALTITUDE 15, INCLINATION  |
| 8. PRINCIPAL INVESTIGATOR 1. ORGANIZATION B. TELEPHONE   | A6 SPECIAL REQUIREMENTS  |
| GODDARD SPACE FLT CENTER   | CRYOSTAT WITH 1 YEAR LIPPTINE  |
| GODDARD SPACE PLT CENTER   | OPTICAL MODILE WITH CRYOSTAT. FIRETRONIC DOWER SUDDIY MODILES.                                     |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE 16. CONTRACT NUMBER 16. CONTRACT 17. FT. P. C. CONTRACT 17. FT. C.  |  |
| AN VONTER OF STREET  | 65 I.B 4.32 CU PT 26 WATTS 5 WATTS 35 WATTS  |
| . B. B. NASA HDOTRS 05SA/SRN 202-962-  | NITHENCE   |
| 23 LOCATION ( 24 FLIGHT 25.LI  | 59. CALIBRATION 60. DATA   |
| GODDARD SPACE PLT CENTER GREENBELT, MARYLAND NA 42 MONTHS  | S EVERY 15 AND 16 PRAME DELAYED TELEMETRY  |
| INTERFEROMETER, IR BEAM-SPLITTER HICHELSON SPECTROMETER PRO  | 312.5 WORDS/SRC TO RECORDER; 2 CHANNEL RECORDER REQUIRED.  |
| KET NIMBUS E   |  |
| 30. PURPOSE  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY - TO DETERBINE VERTICAL ATMOSPHERIC TEMPERATURE PROPILES ON A GLOBAL BASIS *** TO OBTAIN SURFACE BRIGHTNESS TO THE PROPINE STATEMENT OF TH | GOOD SIGNAL TO NOISE RATIO, SHORT TIME CONSTANT *** EXTENSIVE CARRESTORING REQUIRED. IMC REQUIRED. |
| . LEGRATORES MATRIX IND. SPECIARL NEGLOS OF INIDADS.   | 1) HANEL, R.A., ET AL: PROPOSAL FOR NIMBUS E INPRARED INTERPER-                                    |
|  | OMETER SPECTROMETER, GSPC, PEB 68.   |
| 31. PRINCIPLES OF OPERATION  |  |
| THIS IS A TWYMAN-GREEN MODIFICATION OF A MICHELSON INTERPEROMET-   |  |
| ER SPECTROMETER OPERATING IN THE S.O TO 20 MICRON WAVELENGTH RE-<br>TION WITH A POV OP 8 DEGREES. RADIATION PROM A CYLINDER OP   | 65, HISTORICAL REMARKS   |
| ATMOSPHERE, WHOSE BASE ON THE EARTH'S SURFACE IS A CIRCLE 80 NM  |  |
| FRUMENT  | 66. DIAGRAMS   |
| TWO BEAMS, ONE OF WHICH IS REFLECTED FROM A MOVING MIRROR, RE-   |  |
| DETECTOR, INTERF   |  |
| STREETS RESULT FROM ING PAIN LENGIN DIFFERENCES IN THE 2 SEARS STREET MIRROR MOVES. IT TRAVELS ABOUT 2 MM IN 11 SEC TO GIVE AN   |  |
| INTERPEROGRAM WHICH IS RECORDED ON TAPE. OBSERVATIONS ARE BEGUN  |  |
| THERE IS NO OVERLAP IN SUCCESSIVE OBSERVATIONS, APTER RECORDING  |  |
| 14 INTERPEROGRAMS, 2 CALIBRATION OBSERVATIONS ARE MADE, ONE FOR A REFERENCE BLACKBODY AT 300 K AND ONE FOR OUTER SPACE, A POURI-   |  |
| TRANSPORMATION, PERPORMED BY DIGITAL COMPUTER, MUST E  |  |
| PRODUCE A SPECTE<br>ONS, APPROPRIATE   |  |
| ABSORPTION REGIONS MUST BE CHOSEN AND EMPLOYED IN AN INVERSION OF THE RADIATIVE TRANSPER EQUATIONS   |  |
|  |  |
| IR THERMAL BMISSION PROM THE EARTH BETWEEN 7 AND 22 MICRONS.   |  |
|  |  |
| 34. PRECISION AND ACCURACY   |  |
|  |  |

|   | INSTRUMENT RESUME   | ANGE  |
|---|---|---|
| NATI  | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER  | 38. PIELD OF VIEW 39. GROUND SWATH  |
|   | CAMBRIDGE, MASSACHUSETTS  |   |
|   | ı   | 40. ANGULAR RESOLUTION 41. SPATIAL RESOLUTION   |
| INTERROGATION, RECO   | RECORDING, AND LOCATION SYSTEM IRLS E25   | NA NA 1971 NA |
| 6. PRINCIPAL INVESTIGATOR   | 7. ORGANIZATION 8. TELEPHONE  | NA SPECIAL PEQUIPEMENTS MED SUN-SYNCH RETROGRADE  |
| HOGAN, G.   | GODDARD SPACE PLT CENTER 301-972-6465   | 4). COMPONENTS  |
| KLEINBERG, L. GONTERCT NIMES  | DODARD SPACE PLT CENTER   | 48. WEIGHT MY UNITED KO AVPRACE POWER IS STANGEY POWER 159 PEAK POWED IN MITE   |
| N. A. N.                                      | NA INACT NOMBER 19: DATE 19: DATE NA INACT  | 12. VOLUME 32. AVERAGE TOWER ST. STREET ST. TEXT TOWER  |
| ONITOR  | 20, PGM OFFICE 2  | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING   |
| SCHARDT, B.B.   | NASA HDOTRS   OSSA/SRN 202-962-0891   | SOURCE NONE NONE NONE SOURCESOURNE ON FREQUENCY OF OBSERVATION  |
| GODDARD SPACE FLT CENTER GREENBELT, M.  | ARYLAND NA  | NONE REALTIME TELEMETRY   |
| DATA RELAY  | 1950/ATT 1950 SPACECHAFT PRO  |   |
| NAV. MET. ERSP  | NIMBUS E  | MITTED IN REAL TIME VIA ATS R SINCHRONOUS SPACECRAFT TO GROUND.   |
| PRIMARY-TO EXTEND T   | PRIMARY-TO EXTEND THE OPERATIONAL UTILITY OF THE IRLS SYSTEM BY   |   |
| DEVELOPING AND LAUNCHING A SMALL NUMBER   | DEVELOPING AND LAUNCHING A SMALL NUMBER OF BALLOON INTERROGATION  | 64. BEFERENCES  |
| SECONDARY-TO RELAY  |   | 1) HOGAN, G. AND KLEINBERG, L.: PROPOSAL POR A TECHNOLOGICAL  |
| DATA PROCESSING FACILITY IN REALTIME V<br>PETHIBNING DATA TO THE IDIS CIVES A NAU | DATA PROCESSING PACILITY IN REALTIME VIA THE ATS F SATELLITE.   | XPERIMENT BASED ON THE INTERROGA  |
| 31. PRINCIPLES OF OPERATION   | IIS TELES A MAY TO ALL TON CAPADLLILLS  | OF GLOBAL OBSERVATION AND ANALYSIS EXPERIMENT, NAS PUB 1290.  |
| PYDEDIMENT THO DARKS ADE PUTETONES  | M PLOWN IN NIMBUS D WILL BE USED FOR THIS   |   |
| PIVE BALLOONS WILL BE LAUNCHED AT DIFF  | BE LAUNCHED AT DIFFERENT LEVELS BETWEEN 20  | 65, HISTORICAL REMARKS  |
| AND 200 MILLIBARS &   |   | SPACECRART PACKAGE ESSENTIALLY THE SAME AS ON NIMBUS D  |
| BALLOONS WILL BE INSTRUMENTED TO DETER  | RISING THE BALLOON PACKAGE. THE NIMBUS E  |   |
| DATA-RELAY LINK WILL BE USED TO OBTAIN<br>PRAT TIME THE BANCE MPACIED MENT UTIL   | L BE USED TO OBTAIN BALLOON POSITION IN PRINCE PROPERTY OF A TOTAL OF STORES IN THE TRIS                                |   |
| MEMORY FOR LATER READOUT; (2) NAVIGATI  | ADOUT; (2) NAVIGATION EXPERIMENT - PIVE NAVI-   |   |
| GATION PLATFORMS WILL BE DEPLOYED. INTO PERSONNEL BY THERE OF THE WAS NORMAN      | GATION PLATPORMS WILL BE DEPLOYED. INTERROGATION OF A BUOY WILL BE DEPRODMED BY WIMPILE P IN THE NOBBLY WANDED DISTILLY |   |
| DE FEEFURGED BI NIGBUS E IN INE NORTHE<br>OF THE BUOY WILL BE OBTAINED IN REAL 1  |   |   |
| TO THE USER AS REQU   | IRED. INITIATION OF THE RANGE MEASUREMENT OF ORDER WENT WENTER WINDER   |   |
| R IS IN VIEW. THE R   | ATLL BE RELAYED FROM  |   |
| E IN REALTIME TO THE DATA PROCESSING (  | REALTINE TO THE DATA PROCESSING CENTER VIA THE ATS F.   |   |
| CESSING CENTER, THEN RELAYED BACK TO T  | HE NAVIGATING VEHICLE VI  |   |
| ATS F DIRECTLY TO TOPERATION.   | TO THE PLATFORM WITHIN 3 MINUTES OF INITIATION OF   |   |
| 32. PHENOMENA OBSERVED  |   |   |
| DATA KHITTED FROM I<br>33. MEASUREMENT RANGE                                      | DATA KRITIED PROM IRLS PACKAGES ON BALLOONS AND OTHER PLATFORKS.<br>33. measurement range                               |   |
| 34. PRECISION AND ACCURACY  |   |   |
| LOCATION ACCURACY OF ABOUT 2 KM: NOISE  | P ABOUT 2 KM: NOISE PIGURE WILL BR ABOUT 4 DB   |   |
|   |   |   |

| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION   |  |
|---|--|
| ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | 38. FIELD OF VIEW                                  |
| 2. ACRONYM 3. EXP NO  | 40.ANGULAR HESGLUTION 41, SPA                      |
| IONIEC E33A   | NA NA  |
| DUIVALENT IONIZATION CHAMBER (TRIC) 1/10/69 0006  |  |
| AIR PORCE REAPONS LAB 505-247-1711  | EXTENSIVE SHIELD 47. COMPONENTS                    |
| T. T. AIR PORCE WEAPONS LAB   | THREE IONIZATION                                   |
| NA INACT PROPOSAL   | 6 LB 0 0 0   |
| B. B. NASA HDOTRS OSSA/SRN 202-962-0891   | 59. CALIBRATION                                    |
|   | es tel fine tex decine employee                    |
| DSINETRIC TISSUE-ROUINALENT IONIZATION CHAMBER UNC  | EACH OF 3 CHANNE                                   |
| BIOL NIMBUS E   |  |
| -TO MEASURE THE LOSE RATES RESULTING FROM SOLAR PLARE   | اہ   |
|   | SHIELDING FROM O                                   |
| PROM GEOMAGNETICALLY TRAPPED PARTICLES OVER THE SOUTH ATLANTIC; TO PROVIDE DIRECT EXPERIMENTAL TESTS OF MISSION PLANNING COMPUT- RR CODES WHICH ARE PRESENTLY IN USE BY BOTH NASA AND THE USAF. | 1) PROPOSAL FOR MISSION, AFWL/US. OF IONIZING RADI |
|   | ***3) REAGAN,<br>GEMINI-4 AND (                    |
| TION PER UNIT PATH LENGTH AND THE TOTAL ENERGY ABSORDED CAN BE DIRECTLY RELATED TO BIOLOGICAL EPPECT. THE TOTAL ENERGY DEPOSIT-   | 65. HISTORICAL REMARKS                             |
|   | IONTEC AND IONLE                                   |
|   |  |
| WALLED, GAS-PILLED SCHERICAL CAVITY, BOTH THE WALLS AND THE<br>FILLING GAS ARE DESIGNED TO BE TISSUE EQUIVALENT, A SUBSTANCE IS   |  |
| TISSUE EQUIVALENT WHEN THE ATTENUATION AND ABSORPTION OF NUCLEAR<br>RADIATION IN TISSUE IS CLOSELY DUPLICATED IN THE SAMPLE MATER-  |  |
| IAL. THE CHAMBER IS POINTED AWAY PROM THE BARTH. THE CHARGE PRO-<br>DUCED WITHIN THE CHAMBER BY INCOMING RADIATION FROM SPACE IS  |  |
| AMPLIFIED BY AN ELECTRON  |  |
| PREMIPLIFIER. THE SIGNAL IS THEN PHOLESSED BY MAGNETIC ANPLI-<br>FIERS WHICH PRODUCE AN ANALOG OUTPUT OF 0 TO 5 VOLTS, EXACT DE-  |  |
| TAILS OF THE ANALOG TO DIGITAL CONVERTER AND BINARY STORAGE USED WILL DEPEND ON THE PAYLOAD DATA HANDLING EQUIPMENT.  |  |
| 33. PHENOMENA OBSERVED  |  |
| SOLAR PLARE RADIATION AND COSMIC RADIATION OF GALACTIC ORIGIN.  |  |
| PLARE DROWNER 160/SEC/SO CH MAX: COSMIC PARTICLES 2,5/SEC/SO CH   |  |

| THERE LONG AND THE RESOLUTION  NAME OF THE PROPERTY OF THE PRO |
|--|
| A STATE RESOLUTION  A NATIONAL MED   144 ALTITUDE   |
| A COMPONENT STATE OF THE STATE OF STATE |
| AND HOLDER IN THE CONTINGENTS IN THE CONTINGENT  |
| THREE INTO THE DATE OF THE DATE OF THE DATE OF THE DATE OF THREE INTO THREE I |
| EXTENSIVE SHIELDING PROM ALL NUCLEAR RADIATION SOURCES ON COMPONENTS  4. COMPONENTS  4. COMPONENTS  4. WEIGHT TO A VOLUME  5. AVERAGE FOWER IS TRADEATION. SOURCES ON THREE TH |
| THREE INTEGERS SHEEDING  **AUGUSTATION CHAMBERS, SHEEDING  **SURGENT**  **AUGUSTATION CHAMBERS, SHEEDING  **AUGUSTATION CHAMBERS, SHEEDING  **AUGUSTATION CHAMBERS, SHEEDING  **AUGUSTATION CHAMBERS, SHEEDING  **BUTTATION  **AUGUSTATION  **AUGUSTAT |
| THREE IONIZATION CHAMBERS, SHIELDING  ** MEGHAT '9. VOLUME '9. AVERAGE POWER IN STREAMS, STRE |
| SA DELATION APUL/USE; MARCHARD NOT CULT BE STANDARD STRAINED STRAI |
| 10 PROPOSAL FOR AN IONIZING RADIATION EXPERIENCE NOT THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTION OF THE BEAUTIONS OF THE BEAUTION OF THE BEAU |
| 62. TELEMETRY REQUIREMENTS  EACH OF 3 CHANNELS (NNE PER IONIZATION CHANBER) SHOULD BE SAMPLED BUERY CONTINUOUS.  62. TELEMETRY REQUIRES  EACH OF 3 CHANNELS (ONE PER IONIZATION CHANBER) SHOULD BE SAMPLED BUERY 4 SECONDS  63. ADVANTAGES AND LIMITATIONS  NO HOVING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSISHERENCES  1) PROPOSAL FOR AN IONIZING RADIATION SOURCES  64. REFERENCES  1) PROPOSAL FOR AN IONIZING RADIATION SOURCES  65. HEISTON, APWL/USAF, MAR 68.***2) LANGHAM, W.: BIOLOGICAL OF IONIZING RADIATION, JOUR ARROSPACE MED, V. 36, 2, 1955  65. HISTORICAL REMARKS  1. ONTEC AND JONLET ARE BOTH PART OF IONIZING-RADIATION EXECUTOR EXPERIMENT  66. DIAGRAMS  1. ONTEC AND JONLET ARE BOTH PART OF IONIZING-RADIATION EXECUTOR EXPERIMENT  66. DIAGRAMS  1. ONTEC AND JONLET ARE BOTH PART OF IONIZING-RADIATION EXECUTOR EXPERIMENT  66. DIAGRAMS  1. ONTEC AND JONLET ARE BOTH PART OF IONIZING-RADIATION EXPENSIVE AND GENERAL AND G |
| 62. TELEMETRY CONTINUOUS.  62. TELEMETRY CONTINUOUS.  62. TELEMETRY CONTINUOUS.  63. ADVANTAGES AND LIMITATIONS  84. ADVANTAGES AND LIMITATIONS  85. ADVANTAGES AND LIMITATIONS  86. ADVANTAGES AND LIMITATIONS  87. ADVANTAGES AND LIMITATIONS  88. ADVANTAGES AND LIMITATIONS  89. ADVANTAGES AND LIMITATIONS  80. MOVING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSI  80. MOVING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSI  80. MOVING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSI  80. MOVING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSI  80. MOVING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSI  81. PROPOSAL POR AN IONIZING RADIATION EXPERIMENT ON THE NOTE OF IONIZING AND SOURCES  82. MISTORICAL REMARKS  10. MUST AND GEHINI-7, FINAL REPORT CONTRACT NAS 9-1587,  83. MISTORICAL REMARKS  10. MUST AND TONIET ARE ROTH PART OF IONIZING-RADIATION EXPERIMENT  84. MISTORICAL REMARKS  10. MOVING PARTS, RECURS AND TONIZING-RADIATION EXPERIMENT  85. MISTORICAL REMARKS  10. MOVING PARTS, RECOVERY OF TONIZING-RADIATION EXPERIMENT  10. MOVING PARTS, REQUIRED AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS, RECOVERY OF TONIZING-RADIATION EXPENSES  10. MOVING PARTS, REQUIRED AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS, RECOVERY OF TONIZING-RADIATION EXPENSES  10. MOVING PARTS, REQUIRED AND TONIZING-RADIATION EXPERIMENT  10. MOVING PARTS, REQUIRED AND TONIZING-RADIATION EXPERIMENT  10. MOVING PARTS, REQUIRED AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS, REQUIRED AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING-RADIATION EXPENSES  10. MOVING PARTS AND TONIZING |
| EACH DETERMENT RECONFEMENTS  EACH OF 3 CHANNELS (ONE PER IONIZATION CHAMBER) SHOULD RESAMPLED EVERY 4 SECONDS  EA ADVANTAGES AND LIMITATIONS  EA ADVANTAGES AND LIMITATIONS  EA ADVANTAGES AND LIMITATIONS  EA ADVANTAGES AND LIMITATIONS  EACH OF STATES, REQUIRES NO WINDOW; WILL REQUIRE EXTENSISHED ING FROM ON MOUNT ON A PARTY ON THE NUTSING RADIATION SOURCES  EAST OF TOWNIZING RADIATION, JOUR ARROSPACE WED, W. 36, 2, 1965  EA ***3) REAGAN, ET AL: PROTON-ELECTRON SPECTROMETER EXPERING CENTINI-4 AND GEMINI-7, FINAL REPORT CONTRACT NAS 9-1587, ES. HISTORICAL REMARKS  IONTEC AND IONIET ARE ROTH PART OF IONIZING-RADIATION EXEST OF DIAGRAMS  IONTEC AND IONIET ARE ROTH PART OF IONIZING-RADIATION EXEST OF DIAGRAMS  EACH OF THE NUTBER OF THE STATE  |
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| 63. ADVANTAGES AND LIMITATIONS NO WOUNG PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSISHEEDING PROFINE PROPERTY OF THE NOTATION SOURCES.  64. REFERENCES MISSION, PARA NO TONIZING RADIATION EXPERIMENT ON THE NOTING NOTATION, JOUR AEROSPACE WED, V. 36, 2, 1965 OF IONIZING RADIATION, JOUR AEROSPACE WED, V. 36, 2, 1965 ***3) REAGAN, ET AL: PROTON-ELECTRON SPECTROMETER EXPENING BENINI-4 AND GEMINI-7, FINAL REPORT CONTRACT NAS 9-1587, 65. HISTORICAL REMARKS IONTEC AND IONIET ARE ROTH PART OF IONIZING-RADIATION EXERGED OF DIAGRAMS  10 NATEC AND IONIET ARE ROTH PART OF IONIZING-RADIATION EXPENDED  66. DIAGRAMS   |
| NO MOVING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSISHEELDING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENSISHEELDING PROM ON—BOARD NUCLEAR RADIATION SOURCES.  SHEEFENCES  MISSION, APWL/USAF, MAR 68.***2) LANGHAM, W.: BIOLOGICAL OF IONIZING RADIATION JOUR AEROSPACE WED, W. 36, 2, 1965  ***3) REAGAN, ET AL: PROTON—ELECTRON SPECTROMETER EXPENIM GENINI—4 AND GEMINI—7, FINAL REPORT CONTRACT NAS 9-1587, 65. HISTORICAL REMARKS  IONTEC AND IONIET ARE ROTH PART OF IONIZING—RADIATION EXENS DIAGRAMS  SOURCE AND IONIET ARE ROTH PART OF IONIZING—RADIATION EXENS DIAGRAMS   |
| NO BOYING PARTS, REQUIRES NO WINDOW; WILL REQUIRE EXTENDING PART ON BOYING PART ON BOARD NUCLEAR RADIATION SOURCES  1) PROPOSAL POR AN IONIZING RADIATION EXPERIMENT ON THE NISSION, A PWAL/USAF, MAR 68.***2) LANGHAM, W.: BIOLOGICAL OF IONIZING RADIATION, JOUR ARROSPACE WED, V. 36, 2, 1965; ***3) REAGIN, ET.: PROTON-ELECTRON SPECTROMETER EXPERING GEMINI-4 AND GEMINI-7, FINAL REPORT CONTRACT NAS 9-1587, 65. HISTORICAL REMARKS  IONIEC AND IONIET ARE BOTH PART OF IONIZING-RADIATION EXEREDIATION EXERTING BURGARMS  ***********************************  |
| 66. REFERENCES  1) PROPOSAL POR AN IONIZING RADIATION EXPERIMENT ON THE MISSION, AFWL/USAF, MAR 68.***2) LANGHAM, W.: BIOLOGICAL OF IONIZING RADIATION, JOUR AEROSPACE MED, V. 36, 2, 1965  ***3) REAGAN, ET AL: PROTON-ELECTRON SPECTRONETER EXPERING GENINI-4 AND GEMINI-7, FINAL REPORT CONTRACT NAS 9-1587, 65. HISTORICAL REMARKS  IONTEC AND IONLET ARE ROTH PART OF IONIZING-RADIATION EXERNICARAMS  SEDIAGRAMS   |
| 1) PROPOSAL POR AN IONIZING RADIATION EXPERIMENT ON THE N<br>MISSION, APWL/USAF, MAR 68.***2) LANGHAM, 4.: BIOLOGICAL<br>OF IONIZING RADIATION, JOUR AEROSPACE MED, V. 36, 2, 1965<br>***3) REAGAN, ET AL: PROTON-ELECTRON SPECTROMETER EXPERIN<br>GEMINI-4 AND GEMINI-7, FINAL REPORT CONTRACT NAS 9-1587,<br>65. HISTORICAL REMARKS IONIEC AND IONIET ARE ROTH PART OF IONIZING-RADIATION EXE  |
| MISSION, AFWL/USAF, MAR 68.***2) LANGHAM, 4.: BIOLOGICAL OF IONIZING RADIATION, JOUR AEROSPACE MED, V. 36, 2, 1965 ***3) REAGAN, ET AL: PROTON-ELECTRON SPECTROMETER EXPERING GEMINI-4 AND GEMINI-7, FINAL REPORT CONTRACT NAS 9-1587, 65. HISTORICAL REMARKS IONTEC AND IONLET ARE ROTH PART OF IONIZING-RADIATION EXE 66. DIAGRAMS  66. DIAGRAMS  10. N. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.  |
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| 65. HISTORICAL REMARKS  1 IONTEC AND IONIET ARE ROTH PART OF IONIZING-RADIATION 66. DIAGRAMS  10. THE STATE OF TONIZING-RADIATION 10. THE STATE OF TONIZING-RADIATION 10. THE STATE OF TONIZING-RADIATION 10. THE STATE OF TONIZING - RADIATION 10. THE STATE OF TON |
| 66. DIAGRAMS  1 ONTEC AND LONLET ARE BOTH PART OF IONIZING-RADIATION 66. DIAGRAMS  |
| 66. DIAGRAMS  69. DIAGRAMS  FADIATION  FOR IONIZING-RADIATION  FOR DIAGRAMS  |
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| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION CAREFIGNOICS AND SPACE ADMINISTRATION CAREFIGNOICS MASSACHIBETTS CAREFIGNOICS MASSACHIBETTS | 38. FIELD  |
| 1, TITLE 2. ACRONYM 3. EXP NO   | 40.ANGULAR |
| ET E  | NA         |
| LINEAR-ENERGY-TRANSFER SPECTROMETER (LET) 11/10/69 0005   | NA NA      |
| DRGANIZATION 8. TELEPHONE   | 46. SPECIA |
| EAPONS LAB  | 0 TO       |
| T. T. AIR FORCE WEAPONS L   | SPECTE     |
| 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 18. DATE   | 48. WEIGH  |
| IS MONITOR IN A GENCY   20, PGM OFFICE   21, TELEPHONE  | 54. INTER  |
| B. B. NASA ADOTRS OSSA/SRN  |            |
| A. DATE COLLEGE COLLEGE   | 22. CALIB  |
|   | 62. TELEM  |
| SPECTROMETER, SOLID-STATE LINEAR-ENERGY-TRANSPER (LET) UNC  | 7 CHA      |
| 28. SPACECRAPION NTWRITS F  | EVERY      |
| POSE  | 63. ADVAN  |
| ARY-TO MEASURE THE LINEAR ENERGY TRANSFER SPECTRA RESU  | NO MOV     |
| TROUB SOLAR FLAKE FARTICLES HAVING ENERGIES GREATER THAN 17 HEV OVER THE GEOMAGNETIC POLES, ***SECONDARY-TO MEASHRE THE LINEAR            | 64. REFER  |
| ANSFER SPECTRA RESULTING PRON GEOMAGNETICALL  | 1) PRC     |
| ICLES OVER THE SOUTH ATLANTIC; TO PROVIDE DIRECT  | to         |
| TAL TESTS OF NASA AND USAF MISSION PLANNING COMPUTER CODES. 31. PRINCIPLES OF OPERATION   | OF ION     |
| E LINEAR ENERGY TRANSPER (LET) SPECTROMETER CONSISTS OF A   | GEMINI     |
| ID STATE DETECTOR SYSTEM FOR DETERMINING THE NUMBER OF LOW ENER-  | OF SIL SO  |
| 0   | TONTE      |
| MADE TO DETECT RADIATION PROM TRAPPED PARTICLES IN THE VAN ALLEN  | 56. DIAGR  |
| BELLY, PROM PRIMARY COSMIC RADIATION, AND FROM POSSIBLE SOLAR   |            |
| DING TO ENERGY LOSS IN THE SOLID STATE DETECTOR AND   |            |
| NTO PIVE ENERGY CHANNELS: 18.5 - 14.0, 14.0 - 10.0, 10.0 -  |            |
|   |            |
| TELL OF RECORDED IN A DEFENDITE CHANNEL. ALFIA PARTICLES BELOW<br>18.5 MEV STIL BE EXTREMELY RADE COMPARED TO DECIDES AND STIL NOT        |            |
| PROTON COUNTS OF THE SAME ENERGY RANGE, PRO   |            |
| THAN 75 MBY WILL BE PROCESSED IN O  |            |
| OF LOW LET DATA TO PROVIDE INFORMATION ON THE<br>PROV DARFICLES THAT CREATED THE RADIATION HOSE   |            |
| SURE THE RANGE OF HIGH LET BETWEEN 28 AND 424 K   |            |
| RIECTRON VOLTS/MICRON IN MUSCLE TISSUE AND ALSO RECORD ALL PAR-   |            |
| Cura  |            |
| COSHIC, SOLAR PLARE, AND TRAPPED RADIATION IN THE VAN ALLEN BELTS   |            |
| 13. MEANOHEMENI HANGE<br>LINEAR ENERGY TRANSPER PROM 28-424 KBV/MICRON IN MUSCLE TISSUE   | •.         |
|   |            |
|   |            |
|   |            |

|  | 0.5 TO 75.   |
|--|--|
|  | D OF VIEW  |
|  | 180.   |
|  | 40. ANGULAR RESOLUTION 41. STATIAL RESOLUTION  |
|  | INTING ACCURACY 43.  |
|  | THE CAME IN THE COLUMN TWO IS NOT THE COLUMN |
|  | PECIAL REQUIREMENTS  |
|  | O TO 100 DEGREE P OPERATING TEMPERATURE RANGE DESIRED  |
|  |  |
|  | ECTROMETER   |
|  | 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 61. STANDBY FOWER 51. PEAK POWER 33. MTGF  |
|  | 3 LB 0.07 CU FT 1 WATT   |
|  | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 38. SHIELDING  |
| 1.                                     | SENSTTIVE  |
|  | OVERY 61.FREQUENCY O   |
| 1-                                     | DELAYED TELENETRY CONTINUOUS   |
|  | Ches and Carrotte and Ches   |
|  | CHANNEL WHICH SHULLI BE S  |
| '                                      | FOR LESS EREQUENT SAMPLING IS POSSIBLE.  |
| 1                                      | S AND LIMITATIONS  |
|  | NO MOVING PARTS; LARGE UNOBSTRUCTED VIEWING ANGLE REQUIRED.  |
| ــــــــــــــــــــــــــــــــــــــ | 64. REFERENCES   |
| 1                                      | PRINKIN GHT NO FNEETS  |
|  | W.: BIO  |
|  | V. 36, 2, 1965.  |
|  | ROMETER  |
|  | GEMINI-4 AND GEMINI-7, PINAL REPORT CONTRACT NAS 9-1587, 1966.   |
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| ٠.                                     |  |
| a tomb                                 | IONLET AND IONTEC ARE BOTH PART OF IONIZING-RADIATION EXPERIMENT   |
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| RANGE             | JA: FIELD OF VIEW 39. GROUND SWATH   |                          | TIDATA POT NA                     | NOISE | 11/10/69 0005 1.0 DEG | 46. SPECIAL REQUIREMENTS                               | 141 PRELADNCH WARMUP; CIRCULAR ORBITAL WITHIN 50 KM                               |                                 | DSGN   | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE | 25. LEAD TIME 58. CALIBRATION 60. DATA RECOVERY 61. FREQUENCY OF OBSERVATION | MONTHS BLACKBODY STANDARD DELAYED TELEMETRY 62. TELEMETRY REQUIREMENTS | PRO DATA WILL BE RECORDED ON NIMBUS HIGH DATA RATE STORAGE SYSTEM                | CLOSS HOUSEKEEPING DATA IS TRA |  |   | RE FORE- POSAL, V.1, HONEYWELL ARROSPACE, PEB. 68. |                             | AC THE MENT OF THE | SRS. THP 65. HISTORICAL REMARKS                                 | NG RADI-  |  | PLE BUT  | S-HATH*S  | APPROXI-   | R SUB- | E DETEC-  | COOLER. | ARTH'S        |   |   |                       |   |  |
|-------------------|--|--------------------------|-----------------------------------|-------|-----------------------|--|---|---------------------------------|--|--|--|--|--|--------------------------------|--|---|--|-----------------------------|--|---|---|--|--|---|--|--------|---|---------|---------------|---|---|-----------------------|---|--|
| INSTRUMENT RESUME | NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER | CAMBRIDGE, MASSACHUSETTS | TIME DANTANCE INVENETOR EXCEPTION |       | 11/1                  | 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE | BATES, J.C. HONEYWELL AEROSPACE 612-331-4141  o. CO-INVESTIGATOR 10. ORGANIZATION | AN I.P. GCA TECHNOLOGY DIVISION | BEH 14. FLASH INDEX NUMBER 13. DATE 10. DATE | 19. AGENCY 20. PGM OFFICE                          | SCHARDT B. B. INASA UDDITES COSSA/SKN ZUZ-962-0331                           | SANTA BARBARA RES CENTER GOLETA, CALIFORNIA 06/72                      | RADIOMETER, 15-MICRON INFRARED SCANNING PRECISION 28 APPLICATION   20. SPACEGRAT | I.T. ATM-PHYS.                 | PRIMARY-TO TEST INVERSION THEORIES FOR RADIANCE/TEMPERATURE MEA-<br>SIRPRENTS ALONG THE PARTH'S LIME ***SPCONDARY-TO PROVIDE DATA ON | THE ATMOSPHERIC TEMPERATURE-ALTITUDE STRUCTURE ABOVE 30 KM ON A | 344  | 31. PRINCIPLES OF OPERATION | THE EXPERIMENT WILL CONSIST OF SPACEBORNE MEASUREMENTS OF DARFANCE ATOMS A TANGENT TO THE PARTHS SHEWAY TO THE PARTHS  | WILL INCLUDE A RANGE OF ALTITUDES PROM 20 TO 80 KILOMBTERS. THE | EXPERIMENT WILL BE CARRIED OUT USING A PRECISION SCANNING RADI- | BANDWIDTH AND A VERTICAL RESOLUTION OF APPROXIMATELY TWO KILO- | METERS AT THE EARTH'S HORIZON (SCAN RATE = 1 HZ). A SIMPLE BUT<br>ACCURATE ATTITUDE-DETERMINATION SYSTEM WILL BE USED TO PIX | ACCURATELY THE LINE OF SIGHT OF THE RADIONETER TO THE BARTH'S ACTIVE HODITON THIS SYSTEM HILL CONSTST OF A STIN-SPACABLETER | SCOPE-UNIT ALLOWING LINE OF SIGHT TO BE DETERMINED WITH APPROXI- | THE    | TOR (MERCURY-CADMIUM-TELURIDE), AND DETECTOR COOLER, THE DETECTOR IS OPERATED AT APPROXIMATELY LIQUID-NITROGEN TEMPERATURE. | STO     | THE RADIOMETE | ATROSPHERE ABOVE 25 KM THAN HAS BEEN OBTAINED PREVIOUSLI. | 32. PHENOMENA OBSERVED TO ATMINISTRIBLE ALONG LINE OF STAHT | 33. MEASUREMENT RANGE | A DYNAMIC RANGE OF 700 TO 1 (220 TO 270 DEGREES KELVIN) |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER  | 28. SPECTRAL RANGE 38. SPECTRAL RESOLUTION 37. TIME CONSTANT 0.22 TO 0.40 MICRON NA 38. FIELD OF VIEW 38. GROUND SWATH |
|--|--|
|  | 30. BY 30. DEG NA  |
| METEOR-PLASH ANALYSIS EXPERIMENT MEPAN E32   | 40.ANGULAR RESOLUTION 41. SFATIAL RESOLUTION NA NA NA NA NA NA NA NA NA NA NA NA NA                                    |
|  | DINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION  |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 10.0 DEG 10.0 DEG/SEC NED HAGH POSTGRADE. 46. SPECIAL REQUIREMENTS   |
| BASTBUP, F.N. TRW SYSTEMS 213-679-8711-X6920 co-investigator in Generalization in Telephone  | NO OPERATION DURING FULL MOON OR SIGNIFICANT AURORA ACTIVITY ACCOMPOSENTS  |
| B.G. NASA/MSC  | TTER, CALIBRATION LAMP, ELECTRONICS ASSEMBLY   |
| THACT NUMBER 14. FLASH INDEX NUMBER 15. STAFF  | 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 51. STANDS POWER 52. PEAK POWER 53. MTBF                                       |
| 19, AGENCY 20, PGM OFFICE 21   | F HAGNETIC 56. INTERFERENCE 56. INTERFERENCE 57, INTERFERENCE 58. SHIELDING  |
| SCHARDT, B. B. NASA HDOTRS OSSA/SRN 202-962-0891 22 VENDOR 22 CALGET THE TALLED TIME   | 193 CALIBRATION ONE NONE SENSITIVE TEMP RANGE: -20 TO 45 C   |
| TITEMS. NA 14 MON  | SEC EVERY 5 MINUTES DELAYED TELEMETRY  |
| 3-CHANNEL PASSIVE UV OPTICAL   | CONVERSION OF OUTPUTS FROM THREE DATA CHAN   |
| 28. APPLICATION ASTR NIMBIS P  | (1 SAMPLE/10 SECONDS); ALSO EXPERIMENT STATUS, POWER SUPPLY STA-   |
| Pose   | ANTAGES AND LIMITATIONS  |
| PRIMARY-TO YIELD NEW QUANTITATIVE DATA ON FAR UV RADIATION FROM PERBRECTRIAL METRODS FUR CHANNEYS HAVE BEEN SEIECTED TO LOOK BOD   |  |
| z  |  |
| BADIATION.*** SECONDARY-TO DETERMINE WHICH OF THE THREE CHANNELS   | 1) *PROPOSAL TO THE NATIONAL ABRONAUTICS AND SPACE ADMINISTRATION FOR A MEMBER PARTY BY BYDEDIMENT POR MINERIC MEN     |
| FROTIDES DEST STOREFORDS RATIO FOR THE DETECTION OF RELEGIOUS.   | FOR A RELEGIA FLASH ANALIZEK EAFENINENI FOR NIMBUS,<br>GROUP, PEB 68.  |
| 31. PRINCIPLES OF OPERATION  |  |
| THIS EXPERINENT IS DESIGNED TO COUNT AND ANALYZE OPTICAL METEOR PLASHES ON THE NIGHT SIDE OF THE BARTH, OPTICAL DATA WILL BE RE-   |  |
| GTH  | 65. HIŞTORICAL REMARKS   |
| 0.30, AND 0.30-0.40 MICRONS USING A THREE CHANNEL RADIOMETER.  | 6. DIAGRAMS  |
| METEOR INTENSITY, AND BACKGROUND INTENSITY WILL BE MEASURED IN   |  |
| ALL THREE WAVELENGTH BANDS, THE EXPERIMENT METHOD IS TO POINT  |  |
| THE WIDE FIELD OF YIEW, THREE-CHANNEL RADIONFIER STRAIGHT DOWN<br>TOWARDS THE DARK EARTH, ALL CHANNELS ARE ALIGNED TO COVER NEARLY |  |
| ER IS EXPEC  |  |
| AND THE RADIOMETER ELECTRONICS WILL RECORD ELECTRICAL QUANTITIES   |  |
| PROPORTIONAL TO METEOR OBSERVABLES, ASIDE FROM THE THREE RADIO-  |  |
| THE EXPERIENT<br>P AND A POURTH R  |  |
| EL AGAINST DAMAGE  |  |
| CESSIVE BACKCROUND ILLUGINATION LEVELS. THE IN-FLIGHT CALIBRA-<br>TION LAMPES ARE INTEREDED TO CHECK FOR HAJOR CHANGES IN SENSOR   |  |
| TON DARKI LIVE HINDED  |  |
| 23. PHENOMENA OBSERVED  EMITTED UV RADIATION PROM METEORS TRAVELING THROUGH ATMOSPHERE   |  |
|  |  |
| EXPECTED NETEOR COUNT RATE = 0.003 TO 0.012 METEORS/SECOND   |  |
| MINIMUM SIGNAL TO NOISE = 5:1; MAXIHUM SIGNAL TO NOISE = 2600:1  |  |
|  |  |

| INSTRUMENT RESUME  | , 25 SPECTRAL RANGE AS SPECTRAL RESOLUTION AS LALE CONSTANT CHR. N. N. A. CONSTANT |
|--|--|
| NATIONAL ARROMAUTICS AND SPAGE ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS                                 | OF VIEW 134 GROUNDSWATE OUR RY 35 DPG 1100   |
| 1. TITLE 2. ACRONYM 3. EXP NO  | SOLUTION, SPATIAL RESOLUTION   |
| MICROWAVE REPRACTION/OCCULTATION EXPERIMENT AIRO B10 (TITLE CONT.)   | 42 POINTING ACCUPACY 145 POINTING PATE 45, ALTITUDE 45, INCL. 113 1.00.            |
| 11/10/69   |  |
| 7. ORGANIZATION  |  |
| LUSIGNAN, DR. B. STANFORD UNIV 415-321-3300 9, CO-INVESTIGATOR 10, ORGANIZATION  | SUBSATELLITE WITH TRANSPONDER  |
| STANFORD UNIV START 415-321  | COHERENT PHASE LOCK TRANSPONDER, OSCILLATOR, PARABOLIC ANTENNA                     |
| 12. TYPE 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. OATE 16. OATE 15. STATUS   | 14. WEIGHT AS. VOLUME PO AVERAGE POWER SCHAMENYOWS SO PEAK POWER SO WITSE          |
| IONITOR 19 AGENCY 20.PGM OFFICE 2  | 34 INTERPRESENCE 35 NITAREHEACE 36 NICERE 19 INTERERERAS. 38 SHIELDING             |
| SCHARDT, B. B. NASA HDOTRS OSSA/SRN 202-962-0891   | SOURC/SEN: NONE 60, DATA RECOVERY 60, FRECUENCY OF DASERVATION                     |
| NA   | TION WIGROUND DELAYED TELEMETRY  |
| TRANSPONDER, COHERENT MICROMAVE  | NIMBELS REPORTINGNIA HANDIING SYSTEM   |
| 29. SPACECRAFT   |  |
| NET NIBUS E  | AS ADVANTABLE AND I MITATIONS  |
| PRIMARY-TO DETERMINE VERTICAL PROPILE OF DENSITY AND PRESSURE  | VERTICAL PROFILE INDEPENDENT OF ATMOSPHERIC STATE: ACCURACY RE-                    |
| P4 6   | BETWEEN 400 AND 600 MB.  |
| PUBLICATE EXPLICACIONAL MALEN MAPON DALA. +++35CONDAN - 10   | 1) PROPOSAL POR A MICROWAVE OCCULTABILON EXPERIMENT ON NIMBILS E                   |
|  | STANFORD UNIV SPLNMAP  |
| 31. PRINCIPLES OF OPERATION  | TINAL BEFORE (1909).   |
| MICROWAVES TRANSMITTED THROUGH THE ATMOSPHERE ARE REPRACTED WITH   |  |
| MISSION OF A MODULATED CARRIER BETWEEN TWO CO-ORBITING SATEL-  | 65, HISTORICAL REMARKS   |
| LITES SPACED SO THAT THE BEAM CUTS THE ATMOSPHERE AT A GIVEN HATCH DEPONTAL MEASUREMENT OF THE PERFORMANCE                         | 66. DIAGRAMS   |
| OF PATH LENGTH VARIATION, RODGLATION PHASE VARIATION, AND  |  |
| ATTENDATION. AT LOW ALTITUDES THE RAY IS ALSO REPRACTED BY WATER VAPOR AND THIS EPPROT MIST BE SEPARATED PROM AIR DENSITY REPROCT. |  |
| DENSITY PROPILES CAN BE CONVERTED TO PRESSURE PROFILES BY  |  |
| ASSUMING A GIVEN SCALE HEIGHT, BY INDEPENDENT TEMPERATURE PRO-   | \  |
| TIONAL SYSTEM USING SEVERAL SUBSATELLITES, IN THE EXPERIMENT A SIDSAFELLITE RATE RELATIVE TO NIMBIS IS RE-                         |  |
| NGS AT DIFFERENT ALTITODES.  |  |
|  |  |
|  |  |
| 32. PHENOMENA OBSERVED   |  |
| PATH LENGTH VARIATION, MODULATION PHASE, SIGNAL AMPLITUDE.   |  |
| PRESSURES OF 10 TO 300 HB; 600 NB WITH WATER VAPOR DATA  |  |
| 3 CM DATH I DUGTH DEPOTATION AT 5 CHZ- 1 MI ACCITACY AROVE 300 MR  |  |
| -  |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONISS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS           | 9 TO 6.0 NICRONS  136. SPECTRAL RES  9 TO 6.0 NICRONS  136. SPECTRAL RES  |
|--|---|
| 1. TITLE  2. ACRONYM 3. EXPINO   | 43.4 BY 0.1 DEG 35 BY / NR FROM DOU NA ALITIODE   |
| NEAR-INPRARED HULTIDETECTOR GRATING SPECTRONETER NIRMUL E04 (TITLE CONT.)  | 3.4 DEG 36 BY 7 NM PROM 600 NM ALTITUDE 42. POINTING RATE 44. ALTITUDE 45. INCLINATION  |
| 11/10/69   | /SEC MED   PO   |
| 6. PRINCIPAL INVESTIGATOR 7. ORIGINATION 8. TELEPHONE STATE OF STATE INTVERSITY 614-7948                                       | 46. SPECIAL REQUIREMENTS PTRID OF VITRU MIST BE CLEAR OF OBJECTS  |
| ORGANIZATION   |   |
| CHARINE DR. N.T. JET PROPULSION LAB 213-354-2144   | SPECTROMETER OPTICS, DETECTOR, ANPLIFIRMS, DEMONULATORS, FILTERS  48. WEIGHT 49. VOLUME 50. AVERAGE POWER 91. STANDBY POWER 52. PEAK POWER 53. MTBF |
| NA<br>AGENCY 20.PGN  | 30 LB 2.5 CU PT 25 WATTS 8 WATTS, 30 WATTS!   |
| B. NASA HDOTRS O   | SQURC/SEN. SENSITIVE: SHUITERS AND COOLERS SW. CALIBRATION SED DATA RECOVERY STREEDISTICY OF OBSERVATION  |
| PRILISION LAB PASADENA, CALIPORNIA NA  | MINUTE DELAYED TELEMETRY  |
| NEAR-IR MOLTIDETECTOR GRATING  | MINIMUM DIT RATE=2000 BPS; TOTAL BITS PER ORBIT = 500,000.  |
|  | OP CHANNELS.  |
| -TO MEASURE (A) THE TEMPERATURE PROFILE OF THE ATMOSE  | NON-SCANNING (NO MOVING PARTS); CRITICAL TEMPERATURE CONTROL RE-  |
| UP TO THE 1 MB LEVEL, (B) THE WATER-VAPOR DISTRIBUTION, (C) THE SURFACE OR CLOUD-TOP TEMPERATURE, (D) THE CLOUD AMOUNT IN THE  | QUIRED, SUN SHIELDING REQUIRED.   |
| AUROF  | 1) SHAW, DR. J.H., ET AL: NEAR-INFRARED MULTIDETECTOR GRATING   |
| POSED INSTRUMENT.  | ***2) KAPLAN,   |
| 31 PRINCIPLES OF OPERATION RADIATION PROM THE PARTH IS COLLECTED BY A TRIESCODE AND RE-  | JOSA, V.49, 1004 (1959).***3) HILLEARY, ET AL, NATURE, 309, 489   |
| PLECTED BY A PLANE MIRROR ONTO THE ENTRANCE SLIT OF THE SPEC-  |   |
| TROMETER, JUST BEFORE REACHING THE SLIT, A TUNING-FORK CHOPPER INTERRIPTS THE BADIATION AT 300 CPS. THE DETECTORS RESPOND TO   | THIS DRODOSAL MAS IPDDATED AND RESURBITITED FOR NIMBUS P.   |
|  | 96. DIAGRAMS  |
| OF THE RADIANCE OF THE CHOPPER YIELDS THE ABSOLUTE VALUE OF THE PARTH RADIANCE. PART OF THE BEAM FALLS ON A PARABOLOIDAL EBERT |   |
| HIRBOR PLACED BEHIND THE SLIT, THE COLLIMATED RADIATION FALLS ON   |   |
| BACK TO THE EBERT MIRROR AND PROM THERE TO THE SPECTRAL PLANE.   |   |
| THE SPECTRAL PLANE CONTAINS THE DETECTOR ASSEMBLY. ISOLATION PILTERS IN PRONT OF THE INDIVIDUAL DETECTORS REJECT ALL BUT THE   |   |
| DESIRED MAYELENGTHS WITH A REJECTION RATIO OF 10,000. EACH DE-   |   |
| TECTOM INC. AN OFFICE THE DETECTIVE ELEMENT IS INVESTED THE  |   |
| IS DEMODULATED   |   |
| CHOPPER PREQUENCY AND THEN INTEGRATED FOR 10 SECONDS. ALL DETECTOR OUTPUTS ARE INTEGRATED SIMULTANEOUSLY AND THEN SAMPLED IN   |   |
| 32. PHENOMENA OBSERVED   |   |
| RADIATION FROM EARTH AND ALMOSPHERE IN 1-6 MICRON REGION 33 MEASUREMENT AANGE  |   |
| TEMP-SURFACE TO 1 MB LEVEL, WATER VAPOR 400 TO 1000 MB LEVEL   |   |
| TEMPERATURE +- 20 PERCENT; CLOUD-TOP HEIGHT WITHIN 100 MB  |   |
|  |   |

| 1  |  |
|--|--|
| MATTOWN ACTIONS TO SELECT RESUME   | 2.7 GHZ GHZ  |
| MATIONAL MEDINALITYS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER |  |
| CAMBRIDGE, MASSACHUSETTS   | 25.4 DEG 270 NM BY 270 NM FROM 600 NM ALTITUDE   |
| 2. ACRONYM   | RESO   |
| OCEAN-SURFACE-TEMPERATURE MICROHAVE RADIOMETER OSTMR E13                     | M 600 NM ALTITUDE  |
|  | MAD CHARGE TO FOUNTING HATE ALTHOUGH TO CHARGE TO CHARGE DOTTONE                             |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE                       | 10 10 10 10 10 10 10 10 10 10 10 10 10 1   |
| EWING, DR.G.C. WOODS HOLE OCEANOGRAPHIC 617-548-1400-X237                    | TWO LARGE HORN ANTENNAS  |
| R 10. ORGANIZATION   | 47. COMPGNENTS   |
| ORTH AMERICAN ROCKWELL   | rer  |
| ONTRACT NUMBER 14. FLASH INDEX NUMBER 15. DATE                               | 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 61. STANDBY FOWER 52. PEAK POWER 53. MTBF            |
| ZA NA  | CU FT 54 WATTS   |
| 19. AGENCY 20. PGM OFFICE  | "194 NITRAFERENCE 55. INTERFERENCE 50. INTERFERENCE 57. INTERFERENCE 58. SHIELDING           |
| SCHARUT, B. B. INASA HUCTIKS USSA/SKN 202-962-069                            | SENSITIVE AND DATA BECOMES   |
| AMERICAN ROCKWELL DOWNEY, CALIFORNIA NA                                      | ONTINUOUS SWITCHING DELAYED TELEMETRY  |
|  |  |
| RADIONETER, 2.7-GHZ GAIN-STABILIZED DICKE PASSIVE MICROWAVE PRO              | EXPERIMENT DATA-1 SAMPLE EVERY 1.5 SECONDS, REFERENCE TEMPERA-                               |
|  | E GITH NIMBER BORCE.   |
|  |  |
| PRIMARY-TO MEASURE GLOBAL SEA SURPACE TEMPERATURE ON A SEMI-                 | HIGH THERMAL ACCURACY, SPATIAL-RESOLUTION OBTAINED IS LOW.                                   |
| DIURNAL WEATHER SCHEDULE *** SECONDARY - TO SUPPORT MARINE                   |  |
| RETECNOLOGY AND OTHER COMMERCIAL AND PUBLIC ENTERPRISES BENE-                |  |
| FITING FROM THESE SCIENTIFIC SERVICES.                                       | 11) MYING, G.C.: PROPOSAL FOR SATELLITE MICROWAVE RADIOMETRY TO SENSE THE SHAPE SHOT, PER 68 |
|  | ***2) VECCHIO, R.A.: EMISSION FROM THE ROUGH SEA, AUTONETICS                                 |
| 31. PRINCIPLES OF OPERATION  |  |
|  |  |
| RMAL RESOLUTION BETTER   |  |
| I K DEGREE ABSOLUTE AND 0.1 DEGREE RELATIVE IS PROPOSED. THE                 | 65. HISTORICAL REMARKS   |
|  |  |
| RESPONDS TO THERMAL RADIATION INCIDENT UPON THE ANTENNA. THE                 | 68. DIAGRAMS   |
| SISTER CONSISTS OF A DICKE RADIOMETER HODIFIED FOR GAIN STABL-               |  |
| LIZATION AND CONTINUOUS CALIBRATION, RATHER THAN EMPLOYING A                 |  |
| ≈ :  |  |
| TWO DIFFERENT MEFERENCE SOURCES. THE REFERENCE SWITCH OPERATES               |  |
| TREPERSONNELLE ARE SEEN ON ALTERNATE OBSERVATIONS OF THE REPERSONNE          |  |
| S. THE RADIOMETER WOULD YIELD  |  |
| INDEPENDENT DATA POINTS FOR ZACH COMPLETE SCAN OF THE EARTH.                 |  |
|  |  |
| SIGNIFICANTLY INCREASE THE INFORMATION AVAILABLE, PARTICULARLY               |  |
| OVER INACCESSIBLE AND CLOUDY AREAS.  |  |
|  |  |
|  |  |
| AN DIEBNOMENA OCCOVER  |  |
| STODOWNY DESCRIPTION OF THE OCORN SIRVED                                     |  |
|  |  |
| RADIANT TEMPERATURE FROM 80 TO 120 DEGREES KELVIN                            |  |
| 2000   |  |
| RADIANT TERPERATURE: 1 DEG K ABSOLUTE; U.1 DEG K RELATIVE                    |  |
|  |  |

| 35. SPECTRAL RANGE   36. SPECTRAL RESOLUTION   37. TIME CONSTANT   2500, A   0.214 PERCENT   38. FIELD OF VIEW   39. GROUND SWATH   5.0 RV 3.0 DPG NA | 40.ANGULAN RESOLUTION AT SETTIAL RESOLUTION  12. POINTING ACCURACY 43. POINTING RATE 44. ALTITUDE 45. INCLINATION  14. POINTING ACCURACY 43. POINTING RATE HIGH  | 49. COMPONENTS  49. COMPONENTS  PHOTOMETER USING ASCOP 541 F 08 18 SOLAR BLIND PHOTOMULTIPLIER  48. WEIGHT AS VOLUME BS AVERAGE POWER S1. STANDSY FOWER S2. PEAK POWER S3. MTBF | 10 LB MAGNETIC BY INTERFERENCE 50. INTERFERENCE 50. INTERFERENCE 50. SHIELDING  54. INTERFERENCE 55. INTERFERENCE 57. INTERFERENCE 59. SHIELDING  58. CALIBRATION 60. DATA RECOVERY  CALIBRATION LIGHTS DELAYED, TELEBETRY  CATEL BUSTAN PROVIDENMENTS   |   | 3 5 5 0  | 35. HISTORICAL REMARKS 36. DIAGRAMS |                            |
|---|--|---|--|---|--|-------------------------------------|----------------------------|
| INSTRUMENT RESUME NATIONAL AERONAUTICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS   | OZONE-CONCENTRATION VERTICAL PROFILE EXPERIMENT OCUP E17 (TITLE CONT.)  A RESUME A R | SERVICE DIAERONORIE  10. ORGANIZATION  10. NA  10. NA  10. FLASH INDEX NUMBER 15. STARE   | NA         INACT PROPOSAL           18. MONITOR         13. AGENCY         20.PGM OFFICE 21. TELEPHONE           SCHARDT, B.         NASA HDOTRS         0.SSA/SRN 202-962-0891           22 VENDOR         23. LOCATION         202-967-25.EGD TIME           24. GOSTON         12           25. LOCATION         NA | PRO-CHANNEL SCANNING UV 20 SPACECHAFT  NIMBUS E | PRIMARY - TO DETERMINE THE OZONE DISTRIBUTION AND ITS VARIABILITY AT ALTITUDES GREATER THAN 40 KILOMETERS. TO DETERMINE OZONE CONCENTRATION DIFFERENCES BETWEEN NIGHTIME AND DAYTIME.*** SECONDARY - TO DETERMINE HORE PRECISELY THAN NOW KNOWN THE CAUSE OF THE DAILY VARIATIONS IN OZONE DISTRIBUTION. |                                     | 34. PRECISION AND ACCURACY |

| NSTRUMENT RESUME   | 38. SPECTRAL RANGE 37. TIME CONSTANT  |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION<br>ELECTRONICS RESEARCH CENTER   | . 4 TO 0.83 MICRONS NA<br>OF VIEW 39. GROUND SWATH  |
| CAMBRIDGE, MASSACHUSETTS 1. ATTLE 1. ACRONYM 3. FYR NO   | 10. BY 10. DEG 100 BY 100 STATUTE MILES FROM 4'96 NM ALT  |
| RH-BEAM VIDICON CANERA SYSTEM  | 6 NM ALT, 2 TO 1  |
| (TITLE CONT.) 4, HESUNE 5, VERSON 11/10 / 69 0006  | 1.0 DRG: MPD STING RATE 44. ALTITUDE 45. INCLINATION TO DRG: TO DRG: MPD STIN SYNCH REPROCERTINE  |
| OR 7. ORGANIZATION 8. TELEP  |   |
| B. NASA HDQTRS   | CRITICAL LAUNCH WINDOW REQUIREMENTS   |
| FRIN. O. GODDARD SPACE PLT CENTER  | 3 TV CAMERAS, TAPE RECORDER   |
| TRACT NUMBER (4. FLASH INDEX NUMBER 15. STATE  | UME 50. AVERAGE POWER S1. STANDBY FOWER S2. PEAK POWER S3. MT   |
| NA NA TNACT PROPOSAL IN MONITOR 19. AGENCY 20. PGM OFFICE 21. TELEPHONE  | 120 LB 52 WATTS 3 WATTS 12 NON 12 MATTS 12 NON 154 MATTS 12 NON 154 MATTS 12 NON 154 MATTS 12 NON 155 MATTS |
| B. B. B. NASA HDQTRS OSSA/SRN 202-962-   | IN PARENCE IN EARTH RIGHT IN THE PENCE  |
| 22. VENDOR  23. LOCATION  24. LACAD TIME  35. LEAD TIME  BCA. ACTROPT POPRONITY DITTO DETINOPORTN. NEW TERROPERY NA.               | 199. CALIBRATION 60. DATA RECOVERY 61. FREGUENCY OF OBSERVATION DRIAYPD AND OFBITTIME WHENTURE OUTER IT C   |
| 175075 47  |   |
| IGH-RESOLUTION 2-INCH RETURN-BEAM VIDICON (TV)   | DDE WILL BE DIRECT READOUT TO EXISTING GROUND   |
| ERSP NIGHTON   | A 4 BBZ DF VIDGO LARE RECOMBER ALLE AREON STORAGE OF UP TO SUMINUTES OF INAGER. SUBSEQUENTLY TRANSMITTED TO ALASKA OF ROSMAN  |
| So   | 83. ADVANTAGES AND LIMITATIONS  |
| PRIMARY-TO OBTAIN COMPLETE DETAILED COVERAGE OF THE U.S. FOR   | THE ORBIT MUST BE PRECISELY KNOWN FOR THE SPACECRAFT TO FULFILL   |
| OF THE 2-INCH RETURN-BEAM VIDICON SYSTEM AND SUPPORTING SHE-   | 64. REFERENCES  |
| SYSTEMS ABOARD A SPACECRAPT.   | 1) PARK, DR. A.B. AND WEINSTEIN, O.: PROPOSAL POR A MULTISPECTRAL<br>TV CAMERA SYSTEM EXPERIMENT POR EARTH RESOURCES APPLICATION,   |
| 1) POINCIPLES OF OPERATION   | USDA/GSPC.  |
| E EXPERIMENT CONSISTS OF THREE 2-INC   |   |
| TO VIEW A  | SE LICTABIA I PERIODE   |
| TOO STATEMEN WILLS SHATTLE BACK CARENA WILL BEFLOY A SEPANATE OFFICE AND THEFT TO THE TOO MILLERICED                               | 65, HISTORICAL REMARKS  |
| WIDE SPECTRAL BANDS WHICH ARE CENTERED ABOUT 535, 680, AND 760   | 66. DIACRAMS  |
| MILLIMICRONS. THE REALISTIC GOAL FOR GROUND RESOLUTION IS 200  |   |
| PRET. THIS REQUIRES A 2640-TV-LINE RESOLUTION AT 2:1 SCENE CON-<br>TRASF WHICH IS WELL WITHIN THE CAPABILITY OF THE SYSTEM, DIRING |   |
| OPERATION THE CAMERAS WILL BE SIMULTANEOUSLY EXPOSED AND THEN  |   |
| SEQUENTIALLY READ-OUT THROUGH A WIDE-BAND DATA LINK, A 100-MILE  |   |
| TURES AT 22.5 SECOND INTERVALS. THE PRIME HODE OF DATA TRANS-  |   |
| MISSION WILL BE DIRECT READOUT TO ROSMAN AND FAIRBANKS. IT IS  |   |
| ALSO PROPOSED THAT A WINE-DAMP VIDEO TAPE RECORDER CAPABLE OF<br>STORING UP TO 30 MINUTES OF VIDEO DATA BE SUPPLIED AS AN AUXIL-   |   |
| IARY DATA HANDLING MODE TO ALLOW OBSERVATION OF AREAS NOT WITH-  |   |
| IN THE RANGE OF A GROUND STATION, AFTER REDUCTION EACH 100 BY 100 MILE SCENE WILL BE AVAILABLE IN THE FORM OF THREE BLACK AND      |   |
| WILL COLOR SEPRENTION OF GRILVES.  |   |
| BADIATION PROM THE SURPACE OF THE EARTH IN THE VISIBLE SPECTRUM  |   |
|  |   |
| DYNAMIC RANGE = 100 TO 1 AT 0.04 FCS; 13 LEVELS OF GRAY 34. PRECISION AND ACCURACY   |   |
| S/N IS APPROX 37 DB AT 0.04 PCS WITHOUT APERTURE CORRECTION  |   |

| INSTRUMENT RESUME  | NA   |
|--|--|
| NATIONAL ARROYANIS ARCA ADMINISTRATION ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | 38. FIELD OF VIEW                            |
| 1. TITLE 2.ACRONYM 3. EXP NO   | T.   |
| ED DATA-COLLECTION EXPERIMENT  |  |
| (TITLE CONT.)  4. RESUME 5. VIRGO.   | 5. VERSION 42. POINTING ACCURACY 43. POINT   |
| 6. PRINCIPAL INVESTIGATOR 7. ORGANIZATION 8. TELEPHONE   | 46. SPECIAL REQUIREMENTS                     |
|  | REQUIRES ONE TRA                             |
| BCA ASTRO-ELECTRONICS  | TRANSMITTER, REC                             |
| 14. FLASH INDEX NUMBER 15. START   |  |
| 104  | SAL 10 LB 0.2                                |
| B. B. NASA HOUTRS OSSA/SRN 202-962-  | TT   |
| 23 LOCATION 23 LOCATION 24 DATE 36 TE 26 T | 26. LEAD TIME 59. CALIBRATION 30 MONTHS NONP |
|  | 1  |
| DATA RELAY, L-BAND 400/466-MHZ   | PRO 150 BITS PER GROU                        |
|  | - 14   |
| DO NORTHER DATE OF THE PROPERTY OF THE PROPERT | 1 n  |
| EXISTING PIVE-TRACK NINBUS HIGH-DATA-RATE STORAGE SUBSISTEN  | 1  |
| (HDRSS) TAPE RECORDER FOR ON-BOARD STORAGE OF DATA TELEMETERED OF DATA TELEMETERED   | TRED 64. REFERENCES                          |
| STATES.  |  |
| 3). PRINCIPLES OF OPERATION  |  |
| COLLECTION SYSTEM WOULD, INITIALLY,  | PROVIDE                                      |
|  | STATIONS. 65. HISTORICAL REMARKS             |
| PER ORBIT. OPERATIONALLY, THE SYSTEM COULD ACCOMODATE 10,000   |  |
| SENSOR STATIONS IN THE U.S. THE DATA WILL BE RECORDED ON ONE   | E 66. DIAGRAMS                               |
| THACK OF TWE-IMACK HURSS TARE RECORDER ON-BOARD THE BUSS SPACECRAFT. TO MINIMIZE THE DEVELOPHENT COSTS ASSOCIATED WITH   | E E  |
| THE EXPERIMENT, A REPORT WILL BE USED ON THE SPACECHART TO STOKE THE ADDRESSES AND INTERROGATION TIMES OF THE SENSOR STATIONS  | STORE  |
| THAT ARE TO BE INTERROGATED DURING THE NEXT ORBIT. EACH SENSOR   | ISOR   |
| STATION WILL BE INDIVIDUALLI INTERNOGATED BI TRANSMITLING UNIQUE ADDRESS PROM A 5-WAIT SPACECRAPT TRANSMITTER VIA AN   | OMNI-  |
| DIRECTIONAL ANTENNA, ASSUMING THAT DATA PROM TEN DIFFERENT SEN-  | N E N I                                      |
| TION OF THE SENSOR PLATFORM TO THE COMPLETION OF ITS REPLY IS  | IS IS  |
| 0.11 SECONDS. THUS THE SPACECRAFT CAN INTERROGATE 9 PLATFORMS PYERY SECOND, OR ABOUT 3,300 PLATFORMS DURING A NORMAL CONTINEN-   | INEN-  |
| IAL UNIED SINIES CORTACI.  |  |
| 32. PHENOMENA OBSERVED   |  |
| DATA READOUT OF SURPACE HYDROLOGIC SENSORS 33. MEASUREMENT RANGE   |  |
| INTERROGATION AND REPLY PROM 10000 STATIONS IN THE UNITED 34 PRECISION AND ACCURACY  | STATES                                       |
| S/C RECEIVER NOISE PIGURE = 4 DB; DATA ACCURACY TO 1 PERCENT   | E  |
|  |  |

| $\lceil \rceil$ | SPECTRAL RANGE   |
|-----------------|--|
|                 | 38 FIFE DOF VIEW 39 GROLIND SWATH  |
|                 | NA NA  |
| 9               | IGULAR RESOLUTION 41, SPATIAL RESOL  |
| RSION           | A2. POINTING ACCURACY   43. POINTING RATE   44. ALTITUDE   15. INCLINATION   |
| 0.5             | MED MED H  |
| П               | REQUIRES ONE TRACK OF THE NIMBUS HDRSS TAPE RECORDER   |
| П               |  |
| ТГ              | B 0 23 CU PT 1 MATT 25 MATTS.  |
| ТΤ              | SOURCE NONE NONE NONE  |
| HS.             | DELAYED TELEMETRY  |
| 1 0             | OF OR A  |
|                 | (L-BAND) CARRIER PREQUENCY, INTERPOGATION CARRIER PREQUENCY IS 400 MHZ. DATA TRANSMITTED TO CDA STATION AT 32 TO 1 SPEED-UP. |
| 2 2             | FOR 535,000  |
|                 | ORDER.   |
|                 | 1) PROPOSAL FOR NIMBUS E SIMPLIPIED DATA COLLECTION EXPERIMENT, RCA/PRINCETON, PEB 68.                                       |
| Þ               |  |
|                 | 65. HISTORICAL REMARKS   |
|                 |  |
|                 | 66. DIAGRAMS   |
| 3 E             |  |
| 1               |  |
|                 |  |
| ļ<br>Z          |  |
|                 |  |
|                 |  |
| П               |  |
| ES              |  |
| П               |  |

| INSTRUMENT RESUME  | 35. SPECTRAL HANGE 35. SPECTRAL RESOLUTION 37. TIME CONSTANT 0.4 TO 0.7 MICRONS NA NA  |
|--|--|
| ELECTRONICS RESEARCH CENTER<br>CAMBRIDGE, MASSACHUSETTS  | 38. FIELD OF VIEW 39. GROUND SWATH 110. BY 0.3 DEG 3000 KM WIDTH PROM 1112 KM ALTITUDE   |
| 2. ACRONYM   | R RESOLUTION 41. SPATIAL RESOLUTION  |
| 3D TELEVISION CAMERA SINTY EX  | G 6 KM PROM 1112 KM ORBITAL ALTI   |
| 11/10/59 0005  | 42, FORTING ACCURACY 43, POINTING HATE AS ALTHOUSE 45, INCLINATION AS THE REPROCESS DE   |
| 7. ORGANIZATION 8. TELEP   |  |
| DY B. SOUTHERN RESEARCH INST   |  |
| FOUL HOUSE DECEMBER OF   | TELEVISION CAMPDA DIECTEDANTES DOGED SHOPLY ANADROD  |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 15. STATUS   | 1 LELETATION CHITERA, ELECTRONICS, FORER SOFFER ADAPTION 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 81. STANDSY POWER 52. PEAK POWER 53. MTBF   |
| NA INACT   | J PT 3 WATTS   |
| 19. AGENCY 20. PGM OFFICE  | AF NERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE  |
| r, B. NASA HDOTRS OSSA/SRN 202-962-  | NONE NONE NONE   |
| 22 VENDOR OPS PROCH TAST DETACHAR ATABAMA NA 30 MONDUS   | A G #44 #46  |
| D TRUTAGUAN ALADAGA  |  |
| THAGER, LINEAR-ARRAY SCANNING TELEVISION   | 3.0 KILOBITS/SRC DIGITAL, OR 500 SAMPLES/SEC ANALOG  |
| PLICATION  |  |
| MET NIEBUS E   | A A A LA LAND A COLOR LINE AND |
| TOTAL OF THE PROPERTY OF HERITAGE AND CONTRACT   | metri digitatonoo da iita maacao   |
|  | z<br>zi  |
| Gel  |  |
| SENSOR RATHER THAN A CONVENTIONAL VIDICON TUBE.  | 1) A SIMPLIFIED TELEVISION CAMERA FOR THE NIMBUS E SPACE PLIGHT,   |
|  | SOUTHERN RESEARCH INSTITUTE, PEB 68.   |
| 3). PRINCIPLES OF OPERATION  |  |
| i i  |  |
| CAMERA SYSTEM, A LINEAR ARRAY OF PHOTODIODES DEPOSITED ON A SIN-   |  |
| GLE SUBSTRATE, TOGETHER WITH CAMERA OPTICS, SERVES AS THE SENSOR   | 65. HISTORICAL REMARKS   |
| CENTRALISM FOR THE CAMERA SYSTEM. EACH OF THE SOC PHOTODIOS IS A SAMPIED ON ONE SECOND INTERVALS AND RESPT FOR THE NEXT INTERES. | 66. DIAGRAMS   |
| OF THE 1   |  |
|  |  |
| ING WHICH TIME THE SPACECRAPT MOVES A SURFACE DISTANCE OF SIX  |  |
| KILCHETERS, THIS PERIOD IS MADE TO COINCIDE WITH THE HORIZONTAL  |  |
| VERAGE OF 3  |  |
| PHOTODIODE IS MULTIPLEXED INTO AN ANALOG-TO-DIGITAL CONVERTER  |  |
| AND SUBSEQUENTLY INTO A DIGITAL RECORDER, PRIOR TO MAGNETIC TAPE   |  |
| RECORDING. THE SPACECRAFT IS INTERROGATED BY A GROUND STATION GLADER A COMPIRED ONE-DARIT PHOTOGRAPH CAN BE REDROUMED.           |  |
|  |  |
|  |  |
|  |  |
|  | -  |
|  |  |
| WORLD WIDE CLOUD COVER   |  |
| IP DIGITIZED, THE VIDEO SIGNAL WILL PROVIDE 32 LEVELS OF GRAY  |  |
|  |  |
| IP DIGITIZED, THE VIDEO SIGNAL WILL PROVIDE 32 LEVELS OF GRAY  |  |

|  | Cubic Control Control Control   | 2                      |                                       |
|--|---|------------------------|---------------------------------------|
|  | ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  |                        | 38. FIELD OF VIEW                     |
| ו, דודנפ   |   | 2. ACRONYM 3. EXP NO   | 40.ANGULAR RESOLUTION 41.             |
| SOLAR-CONSTANT EXPERIMENT (TITLE CONT.)  | MENT  | 4. RESUME S. VENSION   | 42. POINTING ACCURACY 43. PC          |
|  |   | 10/69                  |                                       |
| 6. PRINCIPAL INVESTIGATOR  | 7. ORGANIZATION   | 8. TELEPHONE           | 46. SPECIAL REQUIREMEN                |
| MCKEOGN D.   | PARADAY LABS  | 714-459-2412           | MUST BE POINTE 47. COMPONENTS         |
| BOWYER, J.M.   | KANSAS STATE UNIVERSITY   | +                      | TWO HELIOMETER                        |
| 12. CONTRACT 13. CONTRACT NUMBER   | R 14. FLASH INDEX NUMBER 15. DATE   |                        | 48. WEIGHT 49. VOLUM                  |
| NA NA  |   | NA INACT PROPOSAL      | 5 LB                                  |
| - 1  |   | 20. TelePhone          | NO 11 D                               |
| 22. VENDOR   | MASA RUSTRS 1033A/3RN   | 24 FLIGHT 26 LEAD TIME | 59. CALIBRATION                       |
| List of the List o |   | NA 127.                | CONTINUOUS                            |
| HELIOMETER, HIGH-SENS  | HELIOHETER, HIGH-SENSITIVITY OUARTZ-CRYSTAL DIGITAL   |                        | RAW TELEMETRY                         |
| 28, APPLICATION  | 29. SPACE   | CRAFT                  | CALIBRATION POR                       |
| MET ATH-PHYS, ASTR   | NIMBUS  | e s                    | OF 25 BITS PER 63. ADVANTAGES AND LIN |
| PRIMARY-TO MEASURE IN  | PRIMARY-TO MEASURE IN SPACE THE ABSOLUTE VALUE OF THE SOLAR CON-  | E OF THE SOLAR CON-    | IMPROVED ACCUR                        |
| STANT FREE OF ATROSPH  | STANT FREE OF ATROSPHERIC ATTENUATION WITHIN 0.04 PERCENT. T<br>DAME STIT DOOWING A DECODE TO CORDETATE UTTH SEATHER CYCIES | C.O. PERCENT. THESE    | 64. REFERENCES                        |
| CHANGES IN ATMOSPHERI  | C DENSITY. AND SOLAR ACT  | IVITY.***              | 1) MCKEOWN,                           |
| SECONDARY-TO MEASURE   | SECONDARY-TO MEASURE SHORT-TERM PLUCTUATIONS OF THE SOLAR CON   | OF THE SOLAR CON-      | LNI                                   |
| STANT TO A PRECISION   | A PRECISION OF 0.01 PERCENT.  |                        | LABS, PEB 68.*                        |
| A HELTOMETER (ACTUALL  | Y A PYRHELIOMETERN WILL   | BE USED TO MEASURE     | CONSTANT AND SI                       |
| THE ABSOLUTE VALUE OF  | IE ABSOLUTE VALUE OF THE SOLAR CONSTANT. TWO Y-CUT GOLD-PLATED  | Y-CUT GOLD-PLATED      | ENERGY, VOL                           |
| QUARTZ CRYSTALS WILL   | QUARTZ CRYSTALS WILL BE EMPLOYED, ONE IS OVER-PLATED WITH BEN-  | -PLATED WITH BEN-      | 65. HISTORICAL REMARKS                |
| ENCLOSED IN A THERMAL  | LY STABILIZED CAVITY. TH  | E CRYSTALS ARE IN-     | 66. DIAGRAMS                          |
| CORPORATED INTO OSCIL  | CORPORATED INTO OSCILLATOR CIRCUITS SUCH THAT THE SIGNAL OUTPUT   | THE SIGNAL OUTPUT      |                                       |
| TREQUENCY IS THE BEAT  | PREQUENCY IS THE BEAT PREQUENCY OF THE TWO CRYSTALS. IN OPERA-  | YSTALS. IN OPERA-      |                                       |
| RECTLY TOWARD THE SUN  | SUN WITH THE SHUTTER OPEN. UNDER THESE CIRCUM-  | UNDER THESE CIRCUM-    |                                       |
| TANCES, THE CRYST  | CRYSTAL WOULD REACH A STEADY-STATE EQUILIBRIUM  | TE EQUILIBRIUM         |                                       |
| TERPERATURE, TO PROVI  | TO PROVIDE CALLBRATION, THE SHUTTER WOULD PERIODIA DIAME ATRACE DIAMETER. DIRECTING   | TER WOULD PERIODI-     |                                       |
| ITS VIEW TOWARD SPACE  | ELECTRICAL POWER WOULD  | THEN BE DISSIPATED     |                                       |
| IN THE GOLD PLATING O  | IN THE GOLD PLATING ON THE CRYSTAL. THIS DISSIPATED POWER IS A  | IPATED POWER IS A      |                                       |
| MEASURE OF THE SOLAR   | MEASURE OF THE SOLAR CONSTANT, MEASUREMENTS OF SHORT-TERM FLUC-   | F SHORT-TERM PLUC-     |                                       |
| WITHOUT THE USE OF A   | WITHOUT THE USE OF A SHUTTER, THE CRYSTAL WOULD BE POINTED DI-  | LD BE POINTED DI-      |                                       |
| RECTLY TOWARD THE SUN  | RECTLY TOWARD THE SUN. PLUCTUATIONS IN THE CALIBRATION POWER OF   | LIBRATION POWER OF     |                                       |
| THE HELIOMETER WOULD RADIATION.  | REFLECT SHORT-TERM FLUCT  | UATIONS IN SOLAR       |                                       |
| 32. PHENOMENA OBSERVED   |   |                        |                                       |
| TOTAL SOLAR POWER PAS  | TOTAL SOLAR POWER PASSING THROUGH THE INSTRUMENT APERTURES<br>33. MEASUHEMENT AANGE   | ENT APERTURE           |                                       |
| DYNAMIC RANGE = 0.000  | DYNAMIC RANGE = 0.00001 TO 1.0 WATTS PER SOUARE CENTIMETER  | RE CENTIMETER          |                                       |
| 34. PRECISION AND ACCURACY   |   |                        | _                                     |

|          | 35. SPECTRAL RANGE                             |                    | 36. SPECTRAL RESOLUTION                         | ESOLUTION 37, TIME CONSTANT              |
|----------|--|--------------------|---|--|
| Jω       | NA<br>38. FIELD OF VIEW                        | 39. GROUND SWATH   | D SWATH   |  |
|          | NA NA  | NA                 |   |  |
| <u>`</u> | NA NA  | LOTION             |   |  |
| ت        | DINTING ACCURACY 43.                           |                    | 44. ALTITUDE                                    | 45. INCLINATION                          |
|          |  | Ł                  | MED   | SUN-SYNCH RETROGRADE                     |
|          | ء<br>•   |                    |   | •  |
| 14       | TUST DE FUINTED AL SUN<br>47. COMPONENTS       |                    |   |  |
| 1-15     | TWO HELIOMETERS; 4 Y-CUT CRYSTALS              | UT CRYS            | STALS   | S S S S S S S S S S S S S S S S S S S    |
|          | 5 TB 25 CH F                                   | -                  | WA PPS  |  |
| 101      | E 55. INTERFERENCE                             | NUCLEAN            | 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING | SHIELDING                                |
| 10       | NONE   | TAG 09             | 60. DATA RECOVERY                               | 61 FREQUENCY OF OBSERVATION              |
| ائند     | CONTINUOUS                                     | DELA               | DELAYED TELEMETRY                               | $\prod$                                  |
|          | LEMETRY REQUIREMENTS                           | - 1                |   | •  |
|          | RAW TELEMETRY DATA WILL CALIBRATION POWER PROM | ٦ F                | CONSIST OF TIME, F. HE TWO HELIOMETERS          | FREGUENCY, AND<br>S ACQUIRED AT THE RATE |
|          |  |                    |   |  |
|          | IMPROVED ACCURACY, WIDE                        | E DYNAMIC          | IIC RANGE, AND                                  | DIGITAL OUTPUT                           |
| Ιø       | 64. BEFERENCES                                 |                    |   |  |
| '1       | ONE O N  | BOWVER .1.         | . PROPOSAL TO                                   | MEASURE THE SOLAR                        |
|          | - ABSOLUTE V                                   | VALUE AND          | HORT TERM                                       | PLUCTUATION, PARADAY                     |
|          | 5, FEB 68. ***2) BR                            | NDENBER            | (ANDENBERG, W., CLAUSEN, O., ET                 | AL, J(                                   |
|          | SOC AMER, V. SO, NO. 8                         | 0 (1966<br>DTS#PTB | D. ***3) THEAE                                  | KAKA, M.P.: THE SULAR                    |
|          | NO. 1;   | (1965)             | TOTAL OF SOFT                                   | 400                                      |
|          | 65. HISTORICAL REMARKS                         |                    |   |  |
|          |  |                    |   |  |
| ΨL       | 66. DIAGRAMS                                   |                    |   |  |
|          |  |                    |   |  |
|          |  |                    |   |  |
|          |  |                    |   |  |
|          |  |                    |   |  |
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|          |  |                    |   |  |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICS RESEARCH CENTER CERCENOLOGICS AND SPACE ADMINISTRATION CONTRACTOR ANSWERD AND ANSWERD AND AND AND AND AND AND AND AND AND AN                   | PECTRAL HANGE 1. TO 25. IELD OF VIEW   |
|--|--|
| 1. TITLE (2.ACRONYM) 3. EXP NO   | NA NA ARESOLUTION(4), SPATIAL RESOLUTION   |
|  | 42 POINTING ACCURACY   42 POINTING RATE   44 ALTITUDE   45 INCLINATION   |
| 7. ORGANIZATION 8. TELEPHONE   |  |
| JR. AEROSPACE CORPORATION  | FARTH-ORIENTED STABILIZED PLATFORM; USES SOLAR POINTER   |
| ER (4. FLASH INDEX NUMBER 15. SYART  | SOLAR POINTER, SCANNING AND ROCKING SPECTROMETERS, ELECTRONICS 14. WEIGHT AS VOLUME 52 AVERAGE POWER 53 NIRE 53 AVERAGE POWER 53 NIRE 54 WEIGHT AS VOLUME 55 NIRE 55 AVERAGE FOR 55 NIRE 56 AVERAGE FOR 57 NIRE 57 PEAR POWER 58 NIRE 58 AVERAGE FOR 58 NIRE |
| NA NA NA NA NA NA NA NA NA NA NA NA NA N   | WAGNETIC S NUCLEAR THERMAL IS SUBJECT S  |
| B. NASA HDQTRS OSSA/SRN  | SENSITIVE SENSITIVE 0-40   |
| ACE CORPORATION LOS ANGELES, CALIFORNIA NA   | Y SOURCE   |
| 1 ROCKING AND 1 SCANNING BRAGG CRYSTAL X-RAY   | 300 BPS FOR DATA AND HOUSEKEEPING  |
| 28. APPLICATION  |  |
| 30. PURPOSE  | 63. ADVANTAGES AND LIMITATIONS   |
| PRIMARY-TO OBSERVE THE SOLAR X-RAY SPECTRUM BETWEEN 1-25A WITH<br>SUPPICIENT SPECTRAL AND SPATIAL RESOLUTION TO CONSTRUCT TIME<br>RISTORIES AND SPATIAL HAPS DURING X-RAY PLARES AND X-RAY EMIS-                           | COMBINES TECHNIQUES OF BRAGG DIFFRACTION WITH GRAZING INCIDENCE OPTICS, ALLOWING MONITORING OF A NUMBER OF SOLAR X-RAY LINES   |
| SION ASSOCIATED WITH PLAGE REGIONS OF SUN *** SECONDARY - TO DETERMINE THE ATMOSPHERIC DENSITY BETWEEN 60 AND 250 KM BY OBSERVING THE EXTINCTION OF X-RAY LINES BY THE ATMOSPHERE.   | 1) WALKER, A.B.C., JR.: SOLAR X-RAY SPECTRUM BELOW 25 ANGSTROMS, ARROSPACE CORPORATION, PEB 68.***2) NRUPERT, ET AL: ASTROPHYS. J. LETTERS, 149, 273 (1967).   |
|  |  |
| RETERS WILL BE USED. IF AN EMISSION LINE PROFILE HAS A DISTINCT  | 65. HISTORICAL REMARKS   |
| STRUCTURE ACROSS THE SOLAR DISK [UGE TO SEVERAL DISKRITE SOURCES) AND BETOND THE LIRB, THE RESPONSE OF THE INSTRU-HARM AS IT SCANS WILL REFLECT THIS STRUCTURE, THE ANGULAR RESOLU-  | 66. DIAGRAMS   |
| TION WILL DEPEND ON THE NATURAL LINE WIDTH OF THE CRYSTAL AND THE PRECUENCY WITH WHICH THE SPECTRONETER OUTPUT IS SAMPLED. IN  |  |
| MOST CASES THE SAMPLING RATE AND CRYSTAL LINE WIDTH WILL LIMIT THE RESOLUTION TO A PEW MINUTES. POINTING ERRORS WILL BE NEGLI-   |  |
| GIBLE WITH RESPECT TO THIS RESOLUTION. IF THERE IS A SECOND STRONG BRISSION LINE WITH A BRAGG ANGLE WITHIN ONE DEGREE THEN   |  |
| THE UNFOLDING OF THE ANGLER DISTRIBUTION OF EACH LINE WILL BE<br>COMPLICATED BUT WILL AND BE IMPOSSIBLE. IN ADDITION TO THE ROCK-<br>ING CRYSTAL SPECTROMETERS. A RAD SPECTROMETER (8 TO 25 A) WILL                        |  |
| RDER TO PROVECTRAL REGIC   |  |
| PRETATION OF THE DATA PROF THE ROCKING CRYSTAL SPECTROMETERS, AND TO STUDY HITH LESSER THE AND SPATIAL RESOLUTION THOSE LINES NOT CENTRAL BY THE PROFILE OF THE STUDY THOSE THE STUDY SERVICE OF THE STUDY STUDY SERVICES. |  |
|  |  |
| X-RAY EMISSION FROM THE SUN IN THE 1 TO 25 ANGSTROM REGION 33 MEASUREMENT RANGE  |  |
| DYNAMIC RANGE = 30,000   |  |
|  |  |

|   | 36 SPECTEAL BANGE 12 SPECTEAL BESTILLTION 12 TIME CONSTANT                        |
|---|---|
| INSTRUMENT RESUME   | NA NA   |
| ELECTRONICS RESEARCH CENTER CAMBRIDGE, MASSACHUSETTS  | IROUND SWATH  |
| 1, TITLE 2.ACRONYM 3. EXPINO  | 40.ANGULAR RESOLUTION 41. SPATIAL RESOLUTION                                      |
| AND DATA RELAY EXPERIMENT TOR E.  |   |
|   | ACCURACY 43. POINTING F   |
| 6. PRINCIPAL INVESTIGATOR 1 ORGANIZATION 8 TELEBRANE  | 1.0 DEG 0.1/ DEG/SEC MED  |
| GODDARD SPACE PLT CENTER  |   |
| 10. ORGANIZATION  | 47. COMPONENTS  |
| GODDARD SPACE PLT CENTER  | TRANSPONDER, POWER AMPLIPIER, MULTIPLEXER, ANTENNA SYSTEM                         |
| 12. CONTRACT 13. CONTRACT NUMBER 14. FLASH INDEX NUMBER 16. START 16. START 16. START 16. START 16. STARTUS | 48. WEIGHT 49. VOLUME 50. AVERAGE POWER 61. STANDBY POWER 52. PEAK POWER 53. MTBF |
|   | 48 LB 1.2 CU PT 44 WATTS  |
| 19. AGENÇY 20. PGM OFFICE   | 55. INTERFERENCE 56. INTERFERENCE   |
| r. B. NASA HDQTRS   OSSA/SAN 202-962-   | SOURCE  |
|   |   |
| GODDARD SPACE PLT CENTER GREENBELT, MARYLAND  | 62 TELEMETRY AS NEEDED  |
| DOMI-STRU CLEAND  | AME TO NIMBER OF COMMAND TINE DECIDED AND 110 MUT OF 1 0 CUT                      |
| 29. SPACECRAFT  | DATA LINK I   |
|   |   |
| OSE.  | 63. ADVANTAGES AND LIMITATIONS  |
| PRIMARY-TO DEFINE AND RESOLVE THE TECHNOLOGICAL PROBLEMS IM-  | SES   |
| POSED BY A THO-WAY REAL TIME DATA RELAY LINK PROM THE NIMBUS  | ENDENCE ON THE RECORDERS CAN BE LESSENED.   |
| SPACECRAPT THROUGH THE ATS SATELLITE TO A GROUND BASED DATA   | 64. REFERENCES  |
| DEMONSTRATE THE   | 1) COTE, C., ET AL: A PROPOSAL FOR A TECHNOLOGY EXPERIMENT -                      |
| AND   | NIMBUS E DATA RELAY LINK THROUGH ATS-F, GSPC, MAR 66.                             |
| SION AT S-BAND OVER APPROXIMATELY / UN OF THE NIMBUS ORBIT.   |   |
| 112   |   |
| 10  |   |
| A REPEATER/RELAY, AND (3) A NIMBUS-E SATELLITE WITH THE POLICUA-  | 65. HISTORICAL REMARKS  |
| IG EQUIPMENTS: ANTENNA WITH CONTROL   |   |
| TRANSPONDER, MIMBUS-ATS DATA MULTIPLEXER, AND TWI POWER SIMPLI-   | 66. DIAGRAMS  |
| FIERS. THE DATA MULTIPLEXER RECEIVES SIGNALS FROM THE ONBOARD   |   |
| EXPERIMENTS, SENSORS, TELEMETRY DEVICES, ETC. THE DATA MULTI-   |   |
| PLEXER TRANSLATES THE SEPARATE INPUT SIGNALS IN PREQUENCY   |   |
|   |   |
| SCHEME FOR PHASE MODULATION ONTO AN RF CARRIER. THE HODULATED   |   |
| SIGNAL IS FURTHER TRANSLATED IN PREQUENCY TO 2253 BHZ BY THE UP-  |   |
| SANTES BY THE THE AMPLIPIES. THE THE THE DIRECTIONAL SHOWN  |   |
| ANTENNA. THE SIGNAL TRANSMITTED BY MINBUS WILL BE RECEIVED AT   |   |
| THE ATS BY THE S-BAND RECEIVER. THE RECEIVED SIGNAL WILL BE   |   |
| TRANSLATED TO AN INTERNEDIATE PREQUENCY, DOWN-CONVERTED BY 450  |   |
| N WATTS, AND PED  |   |
| EARTH-COVERAGE S-BARD ANTENNA POR TRANSMISSION TO THE DAP.  |   |
|   |   |
|   |   |
| DATA PROM ONBOARD EXPERIMENTS, SENSORS, TELEMETRY SYSTEMS, ETC.   |   |
| OF BEACH  |   |
| 34. PRECISION AND ACCURACY  |   |
|   |   |
|   |   |

| INSTRUMENT RESUME NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ELECTRONICE RESEARCH CENTER CANADIDIOS MASSACHILICETER          | 38. SPECTRAL RESOLUT  A 7.5 PBRC 39. GROUND SWATH  |
|---|--|
| 1. TITLE 2. ACRONYM 3. EXP NO   | 40 ANGULAR RESOLUTION AT SPATIAL RESOLUTION ALTITUDE   |
| ADIATION POLARIZATION EXPERIMENT VRP ES   | NM ALTITUDE  |
| (TITLE CONT.): 4, RESUME 5, VIESON (11/10/69) 0005  | 42, POINTING ACCUMANCY 43, POINTING RATE 44, ALTITUDE 45, INCLINATION POSIGRADE  |
| TOR 7. ORGANIZATION   | 46, SPECIAL REQUIREMENTS   |
| SERRAA, DR. Z UNIV CALIFORNIA, L.A. 213-825-4134  | 47. COMPONENTS   |
| R. T.A. UNIV CALIFORNIA, L.A.   | ETER, SCANNING MECHANISM, CALIBRATORS, ELECTRONI   |
| BER 14. FLASH INDEX NUMBER 19. STAR   | 48. WEIGHT 48. VOLUME 50. AVERAGE POWER 51. STANDSY FOWER 53. MTBF 15. TR 2.0 CTT PT 20. UB THS 2.0 TB THS 40. UB THS 40. |
| IS. AGENCY   20.PGM OFFICE   20.PGM OFFICE   2  |  |
| SCHARDT, B. NASA HDOTRS   OSSA/SRN 202-962-0891   | ED CALIBRATION OF CATACOLD ATTAC   |
| NA NA NA NA NA NA NA NA NA NA NA NA NA N  | 31   |
|   | 62. TELEMETRY REQUIREMENTS   |
| POLARINETER, ELECTRONECHANICAL 4-CHANNEL PHOTOMULTIPLIER 28 APPLICATION   | 187 BITS PER SECOND TOTAL  |
| II-PHYS   |  |
|   |  |
| PRIMARY-TO DETERMINE ATMOSPHERIC PARAMETERS SUCH AS AEROSOL<br>CONTENT. CONCENTRATION. DISTRIBUTION. AND TURBIDITY BY ACQUIRING | AEROSOL CONTENT DATA WILL BE USEPUL IN INTERPRETATION OF IR<br>RADIOMETRIC DATA: MOVING PARTS  |
| AND ANALYZING DATA ON THE INTENSITY AND POLARIZATION OF LIGHT   | 64. REFERENCES   |
| EMERGING PROM THE EARTH'S ATMOSPHERE IN THE VISIBLE REGION FOR A RANGE OF ANGLES.   | 1) SEKERA, Z. AND HARIHARAN, T.: PROPOSAL FOR VISIBLE RADIATION POLARIZATION MEASUREMENTS PROM UNMANNED SPACECRAFT, UCLA, JAN 68.  |
|   |  |
|   |  |
| THE POLARIMETER IS DESIGNED TO MEASURE THREE OF THE FOUR STOKES PARAMETERS I, Q, AND U OF THE EMERGENT RADIATION FLUX FROM THE  |  |
| CARTH'S SURFACE BY COMPARING POLARIZED BEAMS WITH UNPOLARIZED   | 65. HISTORICAL REMARKS   |
| DRIVEN BEAR SELECTOR WHEEL WHICH IS PLACED IN THE FOCAL PLANE OF  | 66. DIAGRAMS   |
| THE THREE COLLIMATING LENSES, MEASUPEMENTS WILL BE MADE IN FOUR   |  |
| SELECTED SPECTRAL REGIONS, 3800, 4400, 5000, AND 5800 A, USING ADDRODRIATE PILTERS, ONE SET OF STOKES DARAMETERS IN EACH OF THE |  |
| 4 SPECTRAL BANDS WILL BE OBTAINED EACH SECOND. PROVISION WILL BE  |  |
| MADE FOR AN ADEQUATE DYNAMIC RANGE BY BOTH OPTICAL AND ELEC-  |  |
| INCOLC MEANS. A SINCE, FROTONILIERIEM TOBE WILL DE USEU AS INE<br>DETECTOR, INPLIGHT CALIBRATION WILL BE ACCOMPLISHED BY DIRECT |  |
| VIEWING OF THE SUN THROUGH A FILTER SEVERAL TIMES DURING THE  |  |
| MISSION AND BY A 12 WAIT TUNGSTEN-IODINE LAMP PRECEDING AND FOL-  |  |
| GET ON THE EARTH SURFACE AND A SCAN MECHANISM WILL TAKE INTO AC-  |  |
| COUNT THE EFFECTS OF ORBITAL INCLINATION, PRECISION ADJUSTMENTS,  |  |
| ECCENTRICITY, PRRIOD, TARGET LATITUDE AND HEIGHT, AND THE BARTH'S OBLATENESS. A MINIMUM OF 100 SCANS AT 6 MINUTES PER SCAN      |  |
|   |  |
|   |  |
| INTERNATION AND PULARAGATION OF VISIBLE LIGHT FROM THE ALBUSERARDS  |  |
| DYNAMIC BANGE = 0.00082 TO 0.013 WATTS/SQ CM/MICRON/STERADIAN   |  |
| DOINGTON AND ACCOURT.   |  |
| FULBALLANT TO WITHIN 3 FRANCEIL   |  |

| INSTRUMENT RESUME  | 36. SPECTRAL RANGE 36. SPECTRAL RESOLUTION 37. TIME CONSTANT  |
|--|---|
| NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  | 2.200 GRZ   |
| CAMBRIDGE, MASSACHUSETTS   | NA NA NA NA NA NA NA NA NA NA NA NA NA N  |
| 2. ACRONYM   | GULAR RESOLUTION 41. SPATIAL RESOL  |
| WIDE-BAND RRAL-TIME DATA-TRANSMISSION EXPERIMENT DATRAN E29 (TITLE CONT.)  | NA NA ALTITUDE 44. ALTITUDE 45. INCLINATION   |
| 11/10/69 0005  | NA NA MED SUN-SYNCH RETROGRADE  |
| RCA ASTRO-ELECTRONICS  | 46. STEUNINEMENTING   |
| ATOR   | 4). COMPONENTS  |
| BAUNUNG J.   RCA ASTRO-ELECTRONICS   12. CONTRACT NUMBER   14. STARE   16. CONTRACT NUMBER   16. STARE   16. | TRANSPONDER, ANTENNA SYSTEM 48. WEIGHT MS. VOLUME 50. AVERAGE POWER   81. SYANDOV FOWER   52. PEAK POWER   83. MTBF |
| NA NA  | NICE EAR TENEDS   |
| 19. AGENCY   | 54. INTERFERENCE 55. INTERFERENCE 56. INTERFERENCE 57. INTERFERENCE 58. SHIELDING                                   |
| 22. VENDOR 24. FLORE 23. LOCATION 22. VENDOR 24. FLORE 25. LEAD TIME   | SOUNTY ZENI 50. DATA RECOVERY 60. DATA RECOVERY 60. DATA RECOVERY   |
| RCA ASTRO-ELECTRONICS PRINCETON, NEW JERSEY NA   | 62. TELEMETRY REQUIREMENTS  |
| DATA RELAY, S-BAND SELP-FOCUSING PHASED-ARRAY TRANSPONDER PRO  | 2200 MHZ TRANSPONDER WITH A 20 MHZ BANDWIDTH  |
| MET, ERSP  |   |
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| DIND DITOR BOD COUNTY CREATON ACCHIEFTON AND TOACKING  |   |
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| ROODRICK, N. W. IBM CORP PEDERAL SYS DIV 301-921-6000 8. CO-INVESTIGATOR 10. ORGANIZATION 11. TELEPHONE                                  | YAW BRRORS SHOULD BE KNOWN TO 0.05 DEGREE 47. COMPONENTS   |
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| 19. AGENCY 20.PGM OFFICE   | 12 HON 12 B CU FT 12 WATTS 6 WATTS 12 HON 12 HON   |
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| CH MODIFIED AVCS TELEVISION  | 60 KHZ BANDWIDTH RECORDER REQUIRED FOR VIDICON DATA, FRAME READ READ-OUT TIME IS 6 SECONDS, 1410 RITS OF HOUSEWERPING DATA DER   |
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|  | 1) WOODRICK, N.W.: PROPOSAL FOR A HIMBUS WIND VELOCITY EXPERT-<br>MENT, IBM CORP, BETHESDA, MD, FEB 68,***21 LEESE, J.: DIGITAL  |
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|  |  |
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|  |  |
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